E.C. FENNELL INC.
ENGINEERING CONSULTANTS

EA Energy
Abaco Wilson City

Owners Engineering Report

(Limited 60% Review)

Prepared for:

Government of Bahamas/Bahamas Power & Light
for
EA Energy Abaco Wilson City

Prepared by:
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4401 Beacon Circle
West Palm Beach, FL 33407
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March 20, 2026

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Section 1 – Disclaimer and Executive Summary

DISCLAIMER

1. This document is intended for the sole use of the Government of Bahamas/Bahamas Power and Light ("GoB/BPL"). To the extent permitted by law, neither ECF nor any affiliate assumes any responsibility whether in contract, tort including without limitation negligence, or otherwise howsoever, to third parties (being persons other than GoB/BPL). This document must be read in its entirety and is subject to any assumptions and qualifications expressed therein as well as in any other relevant communications in connection with it. This document may contain detailed technical data which is intended for use only by persons possessing expertise in its subject matter.

2. This document may only be reproduced and circulated in accordance with ECF's written agreement with GoB/BPL. No part of this document may be disclosed in any public offering memorandum, prospectus or stock exchange listing, circular or announcement without the express written consent of ECF.

3. This document does not imply that any information is not subject to change. Except and to the extent that checking or verification of information or data is expressly agreed within the written scope of its services, ECF shall not be responsible in any way in connection with erroneous information or data provided to it by GoB/BPL or any third party, or for the effects of any such erroneous information or data whether or not contained or referred to in this document.

4. This Limited Review Report has been prepared by EC Fennell Inc. (ECF) exclusively for the Government of The Bahamas/Bahamas Power and Light (GoB/BPL) in accordance with the scope of services defined in the Agreement between ECF and GoB/BPL. The review was limited to assessing conformance of the submitted design documents with GoB/BPL design criteria and industry best practices. ECF's review did not include independent quality assurance/quality control verification, detailed checking or recalculation of engineering studies or designs, or review of temporary construction works or installations. Responsibility for the accuracy, completeness, and adequacy of the design, calculations, and supporting documentation rests solely with the Independent Power Producer (IPP). This report shall not be construed as a certification of design accuracy, approval of design, or a guarantee of project performance.

EXECUTIVE SUMMARY/BACKGROUND

EC Fennell Inc. (ECF) has prepared this Owner's Engineer **Limited** Review Report in accordance with the Agreements between ECF and the Government of The Bahamas/Bahamas Power and Light (GoB/BPL).

This limited engineering review has been undertaken at the request of GoB/BPL to assess the compliance of Independent Power Producer (IPP) EA Energy for its project at the "Abaco Wison City" site.

ECF has prepared this Limited Review Report based on the **60% Design Documents** submitted by EA Energy (IPP). This review was undertaken solely to assess **conformance with GoB/BPL design criteria and industry best practices**, in accordance with the scope of services defined in ECF's Agreement with GoB/BPL.

The review scope included the following activities, limited to the extent of documentation provided by the IPP:

1. Reviewing the 60% design for conformance with GoB/BPL design criteria and industry best practices.

2. Reviewing design quality and alignment with the scope of services provided to ECF.

3. Assessing the adequacy of the design relative to GoB/BPL's operational and interconnection requirements, based solely on submitted documentation.

4. Reviewing drawings, diagrams, specifications, and system descriptions for sufficiency to support project execution in accordance with GoB/BPL requirements.

5. Confirming that supporting technical studies and calculations were provided with the design package, with the understanding that all calculations had been completed and QA/QC verified by the IPP.

6. Verifying that design packages included required supporting information (e.g., cable profiles, equipment distances, cable sizing, loading, voltage drop, flicker, and wind loading/design basis for overhead equipment), as appropriate to the design stage.

Limitations of Review

Consistent with the contractual scope of services, ECF's review did **not** include:

- Independent QA/QC verification of design documents.
- Detailed checking or recalculating engineering studies, calculations, or sizing.
- Review of temporary construction works or installations.

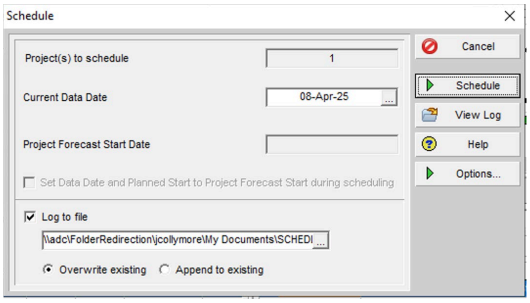
Section 2 – Schedule

DOCUMENT REVIEW

ECF DCN:	FI-VC-0026-1
Document No.:	FI-VC-0026-1
Document Subject / Title:	ABACO-60% Design Resubmittal - SCHEDULE
Document Submission Date:	2/26/26
Document Submitted By:	EA Energy
Document Submitted For:	Review
Review Due Date:	3/20/26
Reviewer's Name:	Juana S.Collymore
Review Submission Date:	3/20/26
Review Stamp:	Accepted with Comments – Please Update Schedule accordingly

Comments:

The Contract Master Schedule, is a Primavera XER file named ILT-BAHAMAS-BSL-16022026. While the file has February 16, 2026 in its file name, the file has not been statused/updated since April 8, 2025) approximately 11 months from today.



Project(s) to schedule: 1

Current Data Date: 08-Apr-25

Project Forecast Start Date:

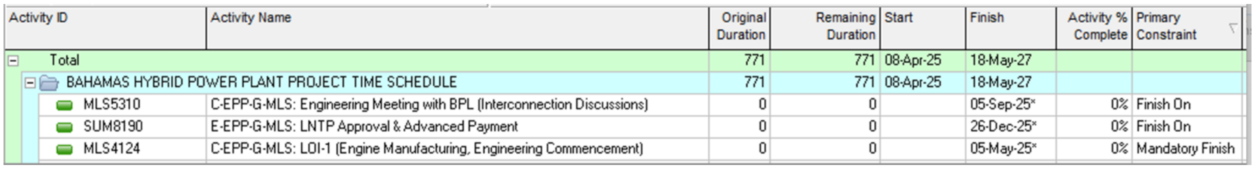
☐ Set Data Date and Planned Start to Project Forecast Start during scheduling

☑ Log to file

\\adc\FolderRedirection\jcollymore\My Documents\SCHEDI

● Overwrite existing ○ Append to existing

The file also has 3 activities without predecessor logic and 92 activities without successor logic. Further, there are 3 activities with hard constraints that prevent the schedule from dynamically responding to progress changes and updates. See the constrained activities below:

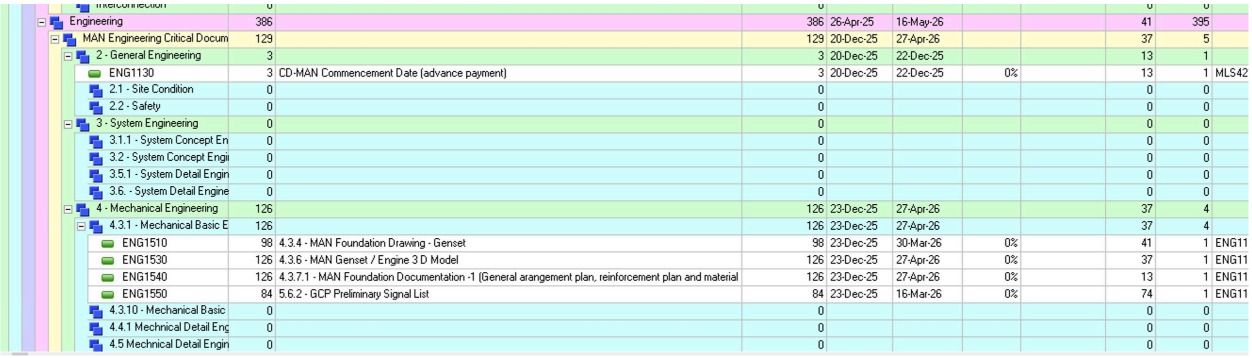


Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	Activity % Complete	Primary Constraint
⊟ Total		771	771	08-Apr-25	18-May-27		
⊟ BAHAMAS HYBRID POWER PLANT PROJECT TIME SCHEDULE		771	771	08-Apr-25	18-May-27		
MLS5310	C-EPP-G-MLS: Engineering Meeting with BPL (Interconnection Discussions)	0	0		05-Sep-25*	0%	Finish On
SUM8190	E-EPP-G-MLS: LNTP Approval & Advanced Payment	0	0		26-Dec-25*	0%	Finish On
MLS4124	C-EPP-G-MLS: LOI-1 (Engine Manufacturing, Engineering Commencement)	0	0		05-May-25*	0%	Mandatory Finish

The project does not have clear start or finish milestones.

There are over 35 near-term activities that have durations longer than 150 days. Durations of near-term activities need to be short enough to measure progress in within 2 or less reporting periods.
The schedule's critical path and long durations (like ID SUM6820 E-EPP-G-SUM: EPC Duration (LNTP to Gas Work Taking Over) that has 508 days). There should be discrete activities on the critical path so that progress can be managed and measured properly.

There are several WBS elements without detail activities, causing concern that the entire scope of work may not be captured in this schedule file. See the example of blue rows without activities below:



Interconnection	0		0					0	0	
Engineering	386		386	26-Apr-25	16-May-26			41	395	
MAN Engineering Critical Docum	129		129	20-Dec-25	27-Apr-26			37	5	
2 - General Engineering	3		3	20-Dec-25	22-Dec-25			13	1	
ENG1130	3	CD-MAN Commencement Date (advance payment)	3	20-Dec-25	22-Dec-25	0%		13	1	MLS42
2.1 - Site Condition	0		0					0	0	
2.2 - Safety	0		0					0	0	
3 - System Engineering	0		0					0	0	
3.1.1 - System Concept En	0		0					0	0	
3.2 - System Concept Engi	0		0					0	0	
3.5.1 - System Detail Engin	0		0					0	0	
3.6. - System Detail Engine	0		0					0	0	
4 - Mechanical Engineering	126		126	23-Dec-25	27-Apr-26			37	4	
4.3.1 - Mechanical Basic E	126		126	23-Dec-25	27-Apr-26			37	4	
ENG1510	98	4.3.4 - MAN Foundation Drawing - Genset	98	23-Dec-25	30-Mar-26	0%		41	1	ENG11
ENG1530	126	4.3.6 - MAN Genset / Engine 3 D Model	126	23-Dec-25	27-Apr-26	0%		37	1	ENG11
ENG1540	126	4.3.7.1 - MAN Foundation Documentation -1 (General arangement plan, reinforcement plan and material	126	23-Dec-25	27-Apr-26	0%		13	1	ENG11
ENG1550	84	5.6.2 - GCP Preliminary Signal List	84	23-Dec-25	16-Mar-26	0%		74	1	ENG11
4.3.10 - Mechanical Basic	0		0					0	0	
4.4.1 Mechnical Detail Eng	0		0					0	0	
4.5 Mechnical Detail Engin	0		0					0	0	

Section 3 – Civil/Structural

DOCUMENT REVIEW

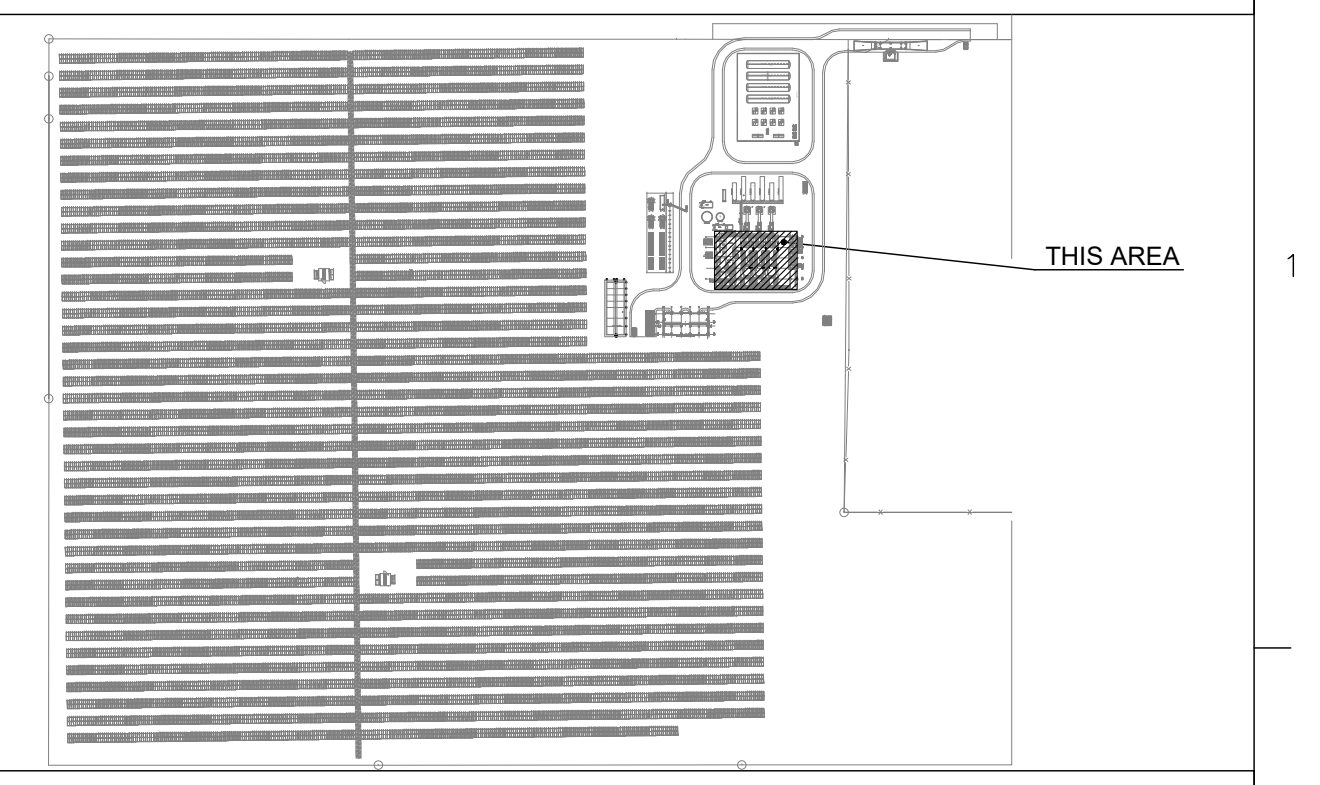
ECF DCN:	FI-VC-0026-1
Document No.:	FI-VC-0026-1
Document Subject / Title:	ABACO-60% Design Resubmittal – Civil/Structural
Document Submission Date:	2-26-26
Document Submitted By:	EA Energy
Document Submitted For:	Review
Review Due Date:	3/20/26
Reviewer's Name:	Jeremy Rollins
Review Submission Date:	3/20/26
Review Stamp:	Accepted with Comments

Comments:

- DRAWING PACKAGE
    - RECOMMEND BETTER QA/QC:
        - RECOMMEND UTILIZING SPELL-CHECK FOR TYPOGRAPHICAL ERRORS AND MISSPELLED WORDS
        - RECOMMEND INCREASING TEXT HEIGHTS FOR DIMENSIONS TO ENSURE VISIBILITY
    - RECOMMEND SHOWING ANGLE OR RISE & RUN ON STAIR DRAWINGS
    - SUGGEST THAT THE COILED RAZOR WIRE MAY NOT BE NECESSARY AND RECOMMEND USING THE 3 ROWS OF BARBED WIRE
    - RECOMMEND ADDING BARBED WIRE ON TOP OF GATES
- CALCULATION PACKAGE
    - RECOMMEND SHOWING SEISMIC COMBINATIONS WHENEVER THERE ARE SEISMIC LOADS IN THE DESIGN
    - RECOMMEND VERIFYING REBAR REINFORCEMENT RATIOS GREATER THAN 100%

FOUNDATION FORMWORK PLAN
1/50
SECTION A-A
1/50
SECTION B-B
1/50
SECTION C-C
1/50
DETAIL W1
1/25
DETAIL W2
1/25
DETAIL W3
1/25
DETAIL W4
1/25
DETAIL B1-B2 (300x300)
1/25
TYPICAL WATER PROOFING & CORROSION PROTECTION DETAIL
TYPICAL DRAINAGE DITCH CROSS SECTION
1/25
F01
F02
F03
F04
F05
F06
F07
F08
F09
HOLD-A
HOLD-B
HOLD-C
HOLD-D
PLINTH DIMENSIONS SHOULD BE CHECKED AFTER EQUIPMENTS ARE DETERMINED
AFTER EQUIPMENTS ARE DETERMINED, WILL BE CONSTRUCTED AS SECOND LEVEL CONCRETE FROM GROUND SLAB WITH DOWELS
AFTER EQUIPMENTS ARE DETERMINED, WILL BE CONSTRUCTED AS SECOND LEVEL CONCRETE FROM FOUNDATION WITH DOWELS
WILL BE CRUSHED FOR FUTURE FOUNDATION
GENERATOR & ALTERNATOR ENGINE FOUNDATION
CENTER OF ENGINE
DRAINAGE PIPE
CHEMICAL ANCHOR
WATER INSULATION 2 LAYERS BITUMEN EMULSION PAINT
LEAN CONCRETE
PE NYLON SHEET
COMPACTED GROUND
COMPACTED BACKFILL
GROUND LEVEL
SURFACE HARDENER
GROUND SLAB
STABILIZED FILL (TBBS PROCTOR)
FOUNDATION
MATERIAL FROM THE EXCAVATION
SAND/GRAVEL FILLING (FILTER GRANULOMETRIC MATERIAL)
DRAINAGE PIPE (TUNNEL TYPE DN200)
SAND
FOR DN200 PIPE h=100 mm.
will be discharged from the appropriate side of the land.
A B C D E F G H I J
1 2 3 4 5

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT

ABA-ENG-CVL-DRW-0001~0010- RELATED STEEL DRAWING
ABA-ENG-CVL-DRW-0050~0058- RELATED ARCHITECTURAL DRAWING

RELATED DRAWINGS

ABA-ENG-CVL-DRW-0100- MACHINE HALL BUILDING FOUNDATION FORMWORK PLAN and SECTIONS
ABA-ENG-CVL-DRW-0101- MACHINE HALL BUILDING FOUNDATION PLINTH FORMWORK,ANCHOR & REBAR DETAILS
ABA-ENG-CVL-DRW-0102- MACHINE HALL BUILDING FOUNDATION REBAR PLAN & SCHEDULE -1
ABA-ENG-CVL-DRW-0103- MACHINE HALL BUILDING FOUNDATION REBAR PLAN & SCHEDULE -2

LEGEND

T:	TOP
B:	BOTTOM
℄:	CENTER LINE
TOC:	TOP OF CONCRETE
BOC:	BOTTOM OF CONCRETE
TYP:	TYPICAL
FNL:	FINISHED LEVEL
ADD:	ADDITIONAL

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M, REBAR LENGTHS ARE IN CM UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. **BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISCIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS,ARCHITECTURAL DRAWINGS, ... MISMATCHES SHOULD BE INFORMED TO DESIGNER.**
5. **FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING**
6. **EVERY FOUNDATION ELEMENT IN CONTACT WITH SOIL SHALL BE PROTECTED BY 2 LAYERS BITUMEN EMULSION PAINT.**

MATERIAL NOTES

1. CLEAR COVER FOR REINFORCEMENT SHALL BE AS FOLLOWS :

FOOTING, FOUNDATION: 50 MM
BEAM: 30 MM
COLUMN and WALL: 40 MM
SLAB: 25 MM

STRENGTH

2. GRADE OF CONCRETE SHALL BE AS FOLLOWS :

fc'= 25 Mpa (FOR FOUNDATION AND UPPER MEMBERS)
fc'= 16 Mpa (FOR LEAN CONCRETE)
fc': specified compressive strenght of concrete

3. GRADE OF REBAR SHALL BE AS FOLLOWS :

REBAR: B420C
MESH: S500a

NOTES

CAPACITY

1. FOUNDATIONS ARE NOT ALLOWED TO CONSTRUCT ON FILL SOIL. FOUNDATIONS SHOULD STAY ON STIFF SOIL (COMPACTED GROUND) WITH THE CAPASITY DEFINED ON GEOTECHNICAL REPORT.
2. THE FILL / SOIL BELOW GROUND SLAB SHALL BE COMPACTED TO MINIMUM %95 MODIFIED PROCTOR DENSITY AT OPTIMUM MOISTURE CONTENT AT PLACES OTHER THAN WHERE CONTROLLED FILLING IS DONE.

HOLD LISTS

A. FOUNDATIONS OF GENERATOR & ALTERNATOR ENGINES ARE ON HOLD.
B. SECONDARY STEELS (STAIRS,PLATFORMS,.....) ARE HOLD.
C. EQUIPMENTS ARE HOLD.
D. GROUND SLAB THICKNESS IS HOLD.

CLIENT
E·A
ENERGY

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
N22

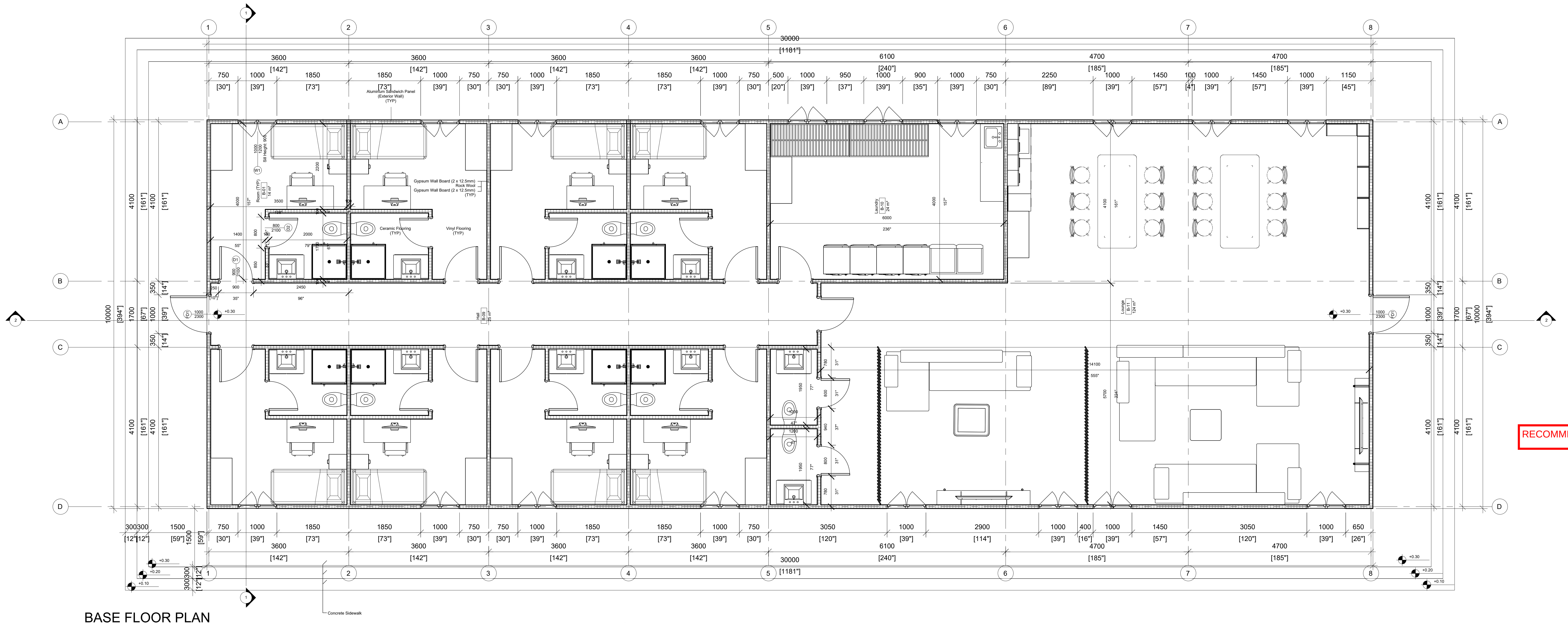
SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
1.5A0	1/50

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	24 Oct 25	FOR APPROVAL	M.G	S.G.H.	M.S.
1	29 Jul 25	FOR APPROVAL	M.G	S.G.H.	M.S.
0	18 Jun 25	FOR APPROVAL	M.G	S.G.H.	M.S.

DRAWING NUMBER: ABA-ENG-CVL-DRW-0100
SHEET: 1
OF: 1
DRAWING NAME: MACHINE HALL BUILDING FOUNDATION FORMWORK PLAN and SECTIONS



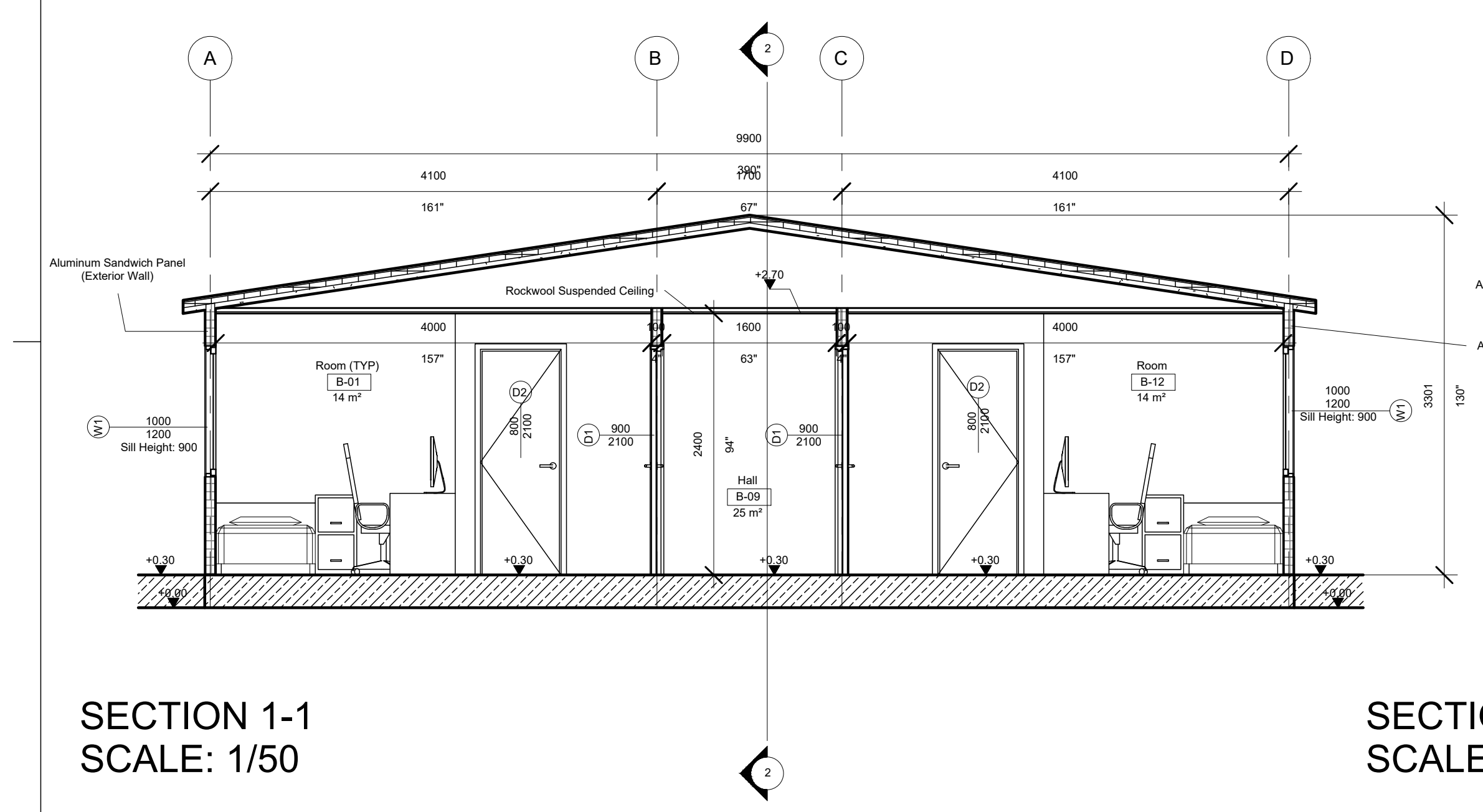
30000
[1181"]
3600
[142"]
6100
[240"]
4700
[185"]
750 [30"]
1000 [39"]
1850 [73"]
500 [20"]
950 [37"]
900 [35"]
2250 [89"]
1450 [57"]
100 [4"]
1150 [45"]
Aluminum Sandwich Panel (Exterior Wall) (TYP)
Gypsum Wall Board (2 x 12.5mm) Rock Wool Gypsum Wall Board (2 x 12.5mm) (TYP)
Ceramic Flooring (TYP)
Vinyl Flooring (TYP)
4100 [161"]
10000 [394"]
350 [14"]
1000 [39"]
1700 [67"]
300 300 [12"][12"]
1500 [59"]
3050 [120"]
2900 [114"]
400 [16"]
650 [26"]
Concrete Sidewalk
A B C D
1 2 3 4 5 6 7 8

BASE FLOOR PLAN
SCALE: 1/50

Door Schedule			
Type	Rough Width	Rough Height	Count
D1 (Interior Door)	900	2100	10
D2 (Toilet/Bathroom Door)	800	2100	10
FD1 (Fire Exit Door)	1000	2300	2

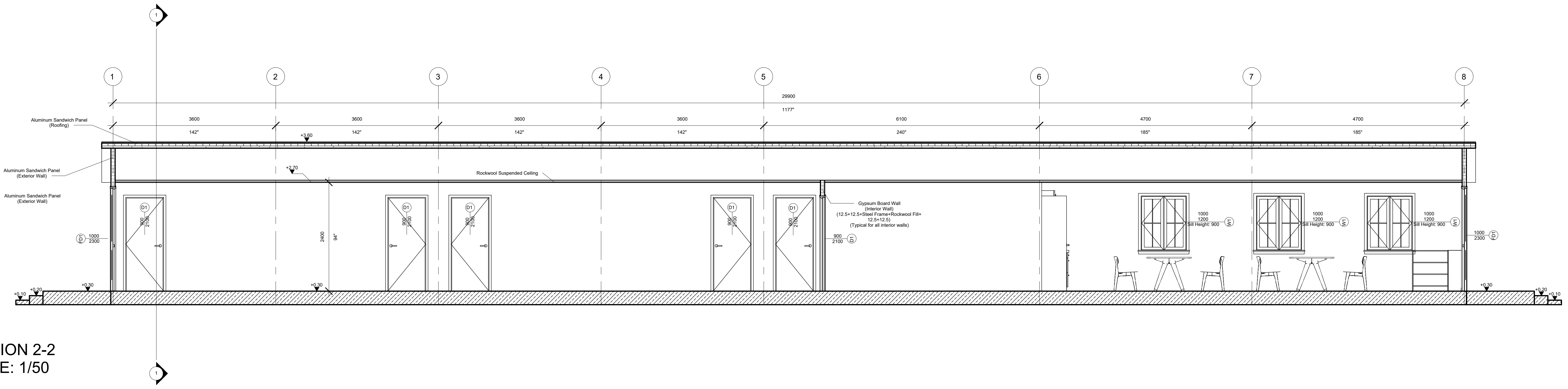
Window Schedule			
Type	Width	Height	Count
W1	1000	1200	18

RECOMMEND INCREASING TEXT HEIGHTS FOR DIMENSIONS TO ENSURE VISIBILITY



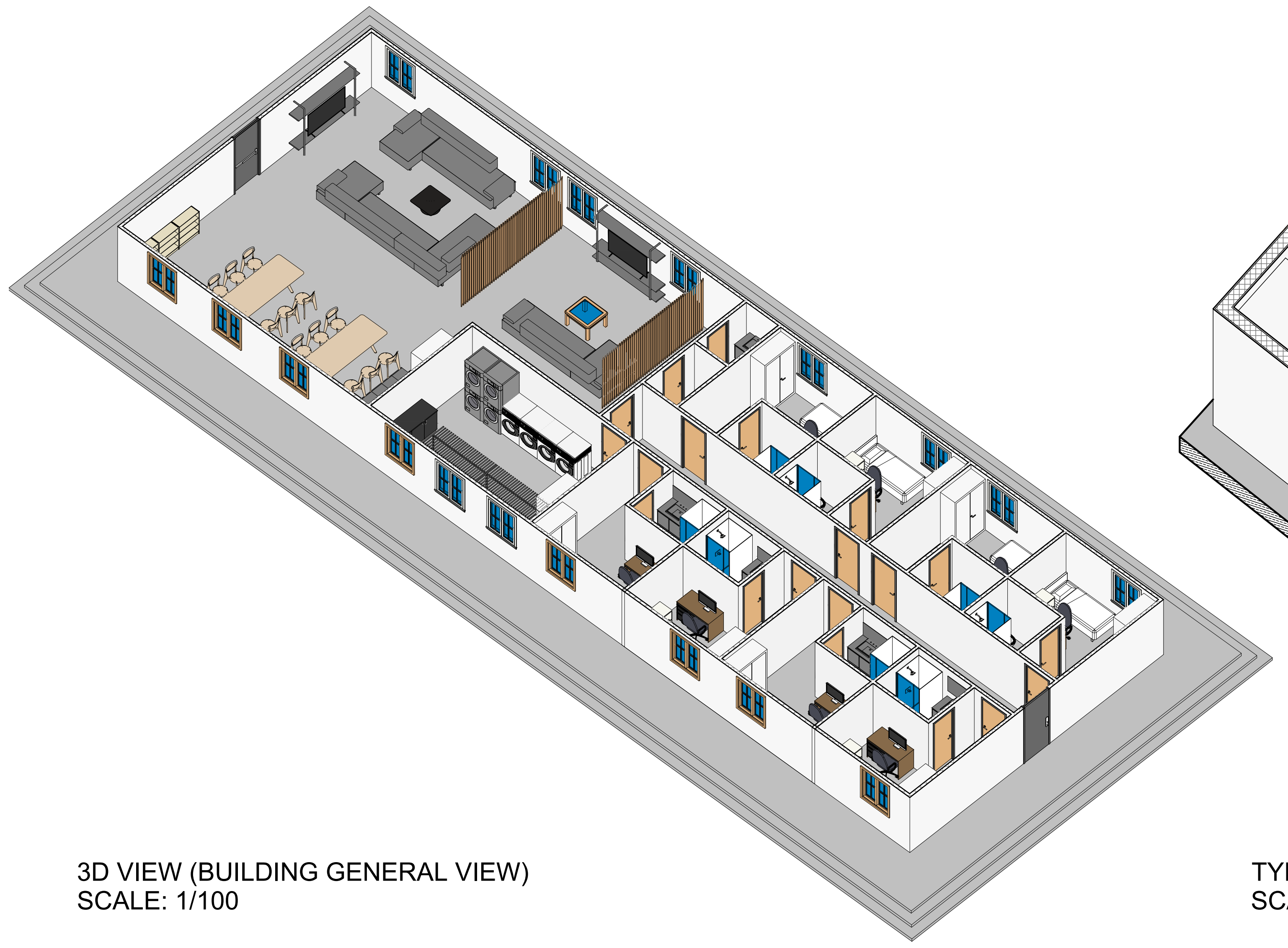
A B C D
4100
161"
Aluminum Sandwich Panel (Exterior Wall)
Rockwool Suspended Ceiling
Aluminum Sandwich Panel (Exterior Wall)
Room (TYP) B-01 14 m²
Hall B-09 25 m²
Room B-12 14 m²

SECTION 1-1
SCALE: 1/50

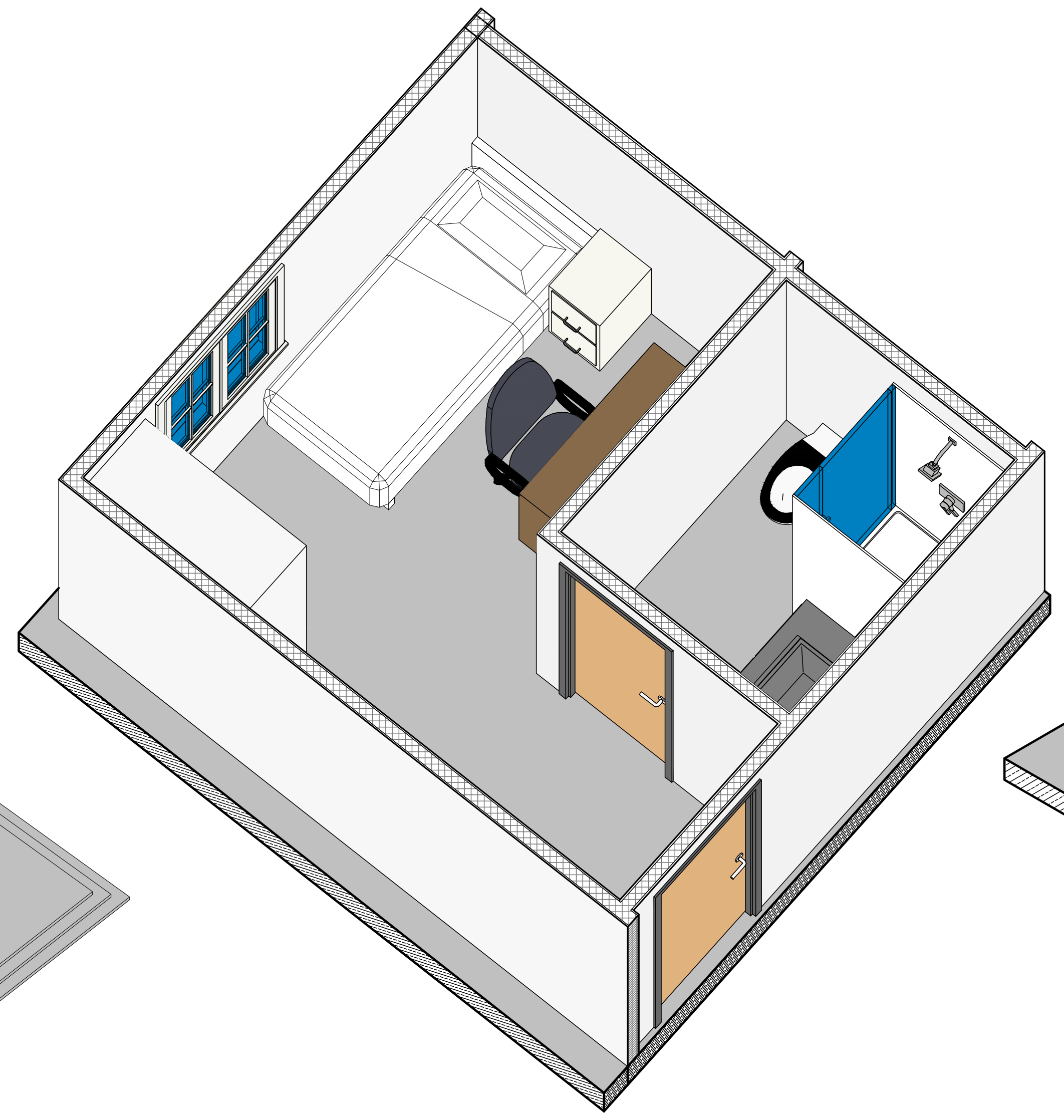


1 2 3 4 5 6 7 8
Aluminum Sandwich Panel (Roofing)
Aluminum Sandwich Panel (Exterior Wall)
Rockwool Suspended Ceiling
3600
142"
6100
240"
4700
185"
Gypsum Board Wall (Interior Wall) (12.5+12.5+Steel Frame+Rockwool Fill+ 12.5+12.5) (Typical for all interior walls)

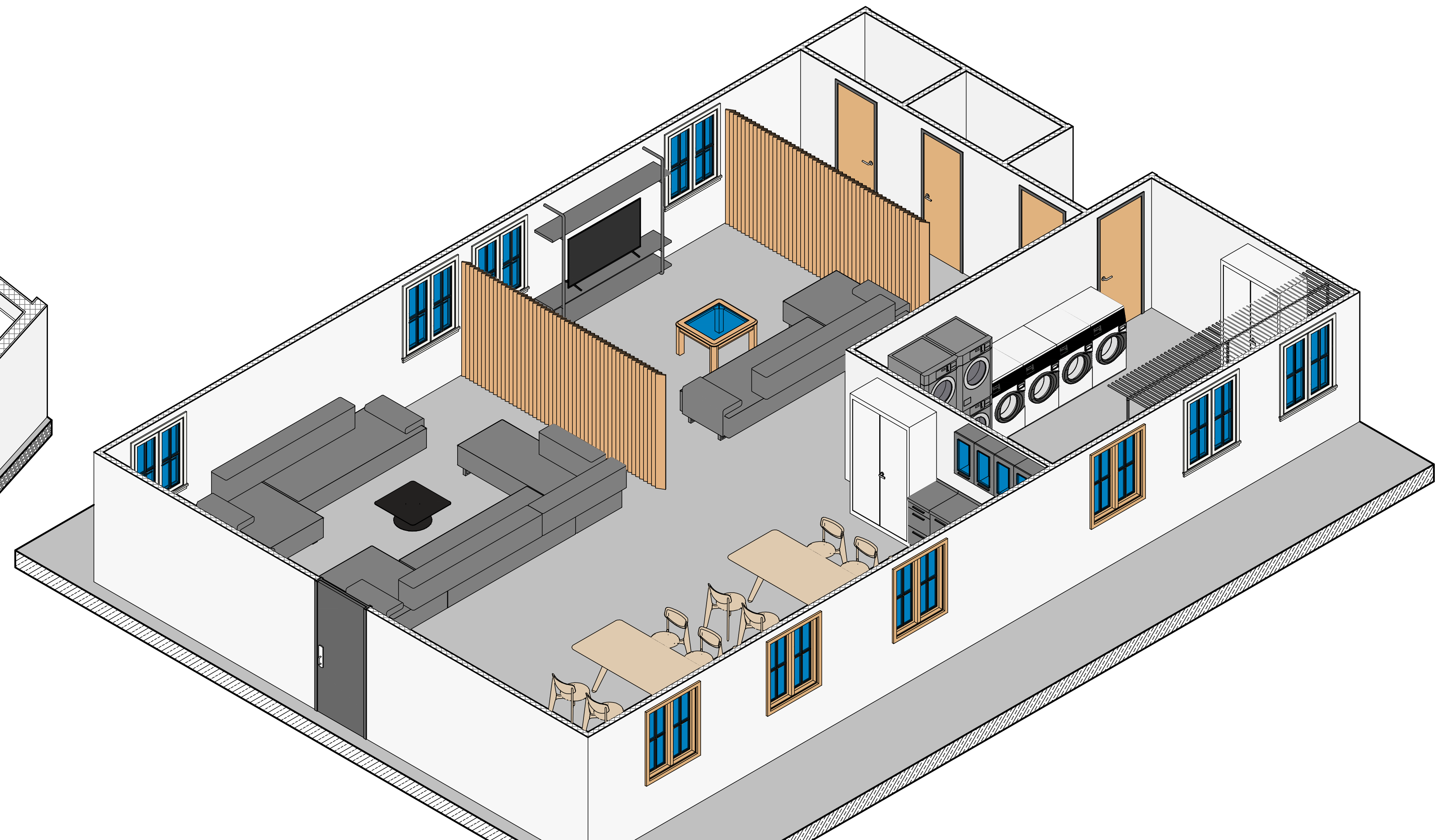
SECTION 2-2
SCALE: 1/50



3D VIEW (BUILDING GENERAL VIEW)
SCALE: 1/100

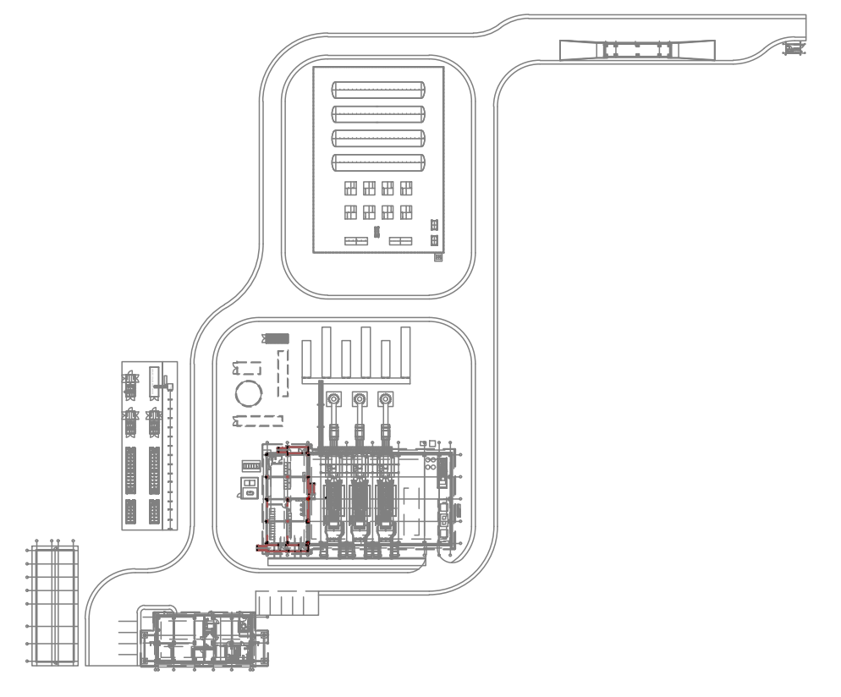


TYPCIAL ROOM MODULE
SCALE: 1/25



LOUNGE & LAUNDRY ROOM
SCALE: 1/25

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

ABA-ENG-CVL-ARC-0003-WAREHOUSE AND ADMINISTRATION BUILDING FLOOR PLANS
ABA-ENG-CVL-ARC-0004-WAREHOUSE AND ADMINISTRATION BUILDING SECTIONS
ABA-ENG-CVL-ARC-0005-WAREHOUSE AND ADMINISTRATION BUILDING CEILING PLANS
ABA-ENG-CVL-ARC-0006-WAREHOUSE AND ADMINISTRATION BUILDING ELEVATIONS
ABA-ENG-CVL-ARC-0007-WAREHOUSE AND ADMINISTRATION BUILDING SANITARY AREA DETAILS
ABA-ENG-CVL-ARC-0008-WAREHOUSE AND ADMINISTRATION BUILDING LAYER LEGENDS
ABA-ENG-CVL-ARC-0009-WAREHOUSE AND ADMINISTRATION BUILDING SYSTEM DETAILS
ABA-ENG-CVL-ARC-0010-WAREHOUSE AND ADMINISTRATION BUILDING DOOR & WINDOW SCHEDULES

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M, UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISCIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS, AND CIVIL DRAWINGS, MISMATCHES SHOULD BE INFORMED TO THE DESIGNER
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

1. INTERIOR GYPSUM WALL BOARDS ARE TYPCIAL THROUGHOUT THE BUILDING AND CONFIGURED AS "12.5+ 12.5+STEEL FRAME+Rockwool Infill+12.5+12.5"

2. EXTERNAL CLADDING (ROOF AND WALLS) IS GALVANIZED STEEL OR ALUMINUM SANDWICH PANEL HAVING THICKNESS OF 0.5MM INNER AND 0.6MM OUTER LAYERS. 50MM ROCKWOOL INSULATION WILL BE CONSIDERED IN BETWEEN.

3. Exterior windows shall be non-corrosive aluminum framed, factory-glazed, and designed for a site wind speed of 200 mph

4. Unless impact-rated, all exterior windows shall be protected by engineered storm shutters per Bahamas Building Code Chapter 31 Cladding and Glazing, Storm Shutters (§3113) .

CLIENT
E A
ENERGY

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
N22

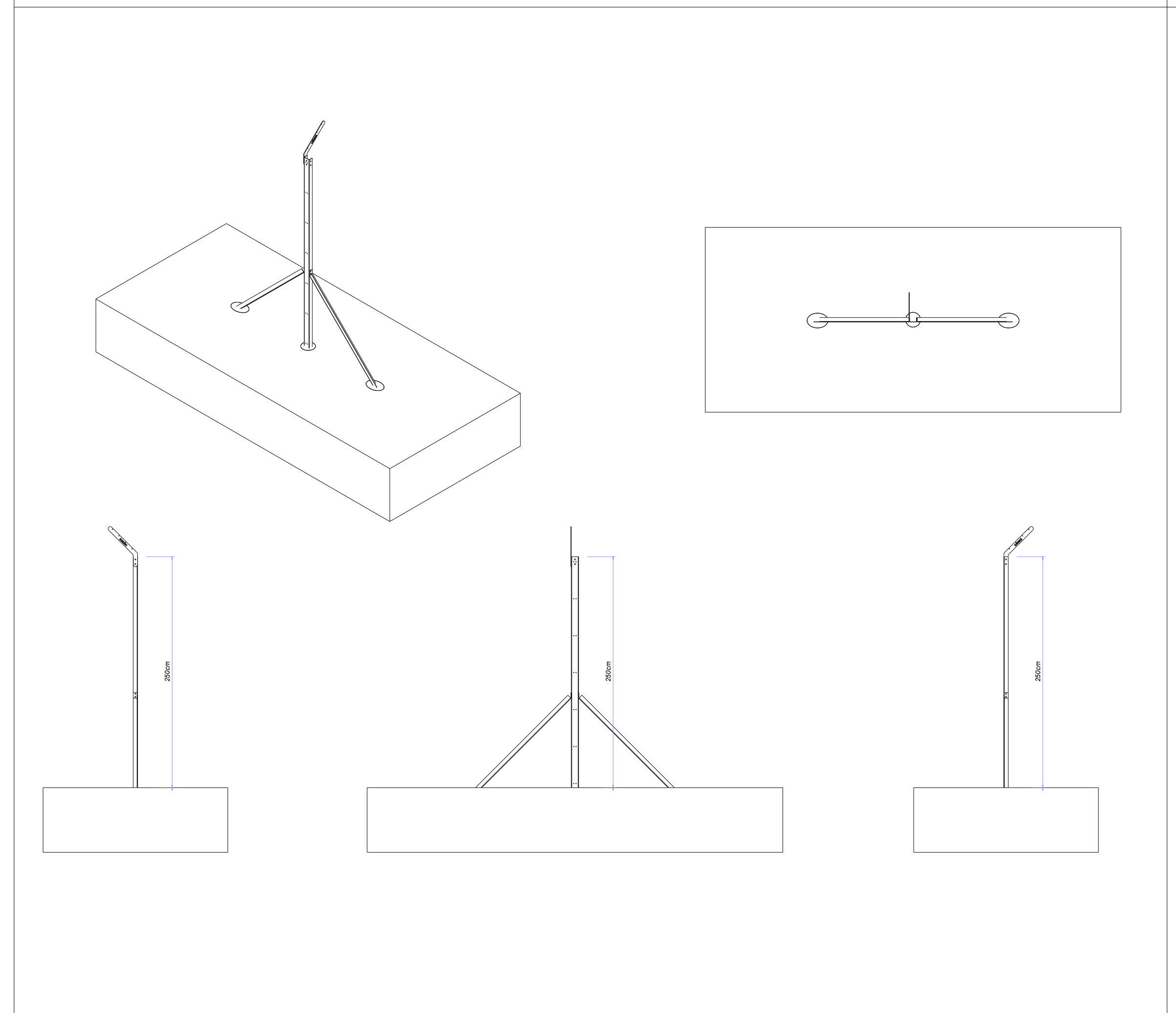
SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

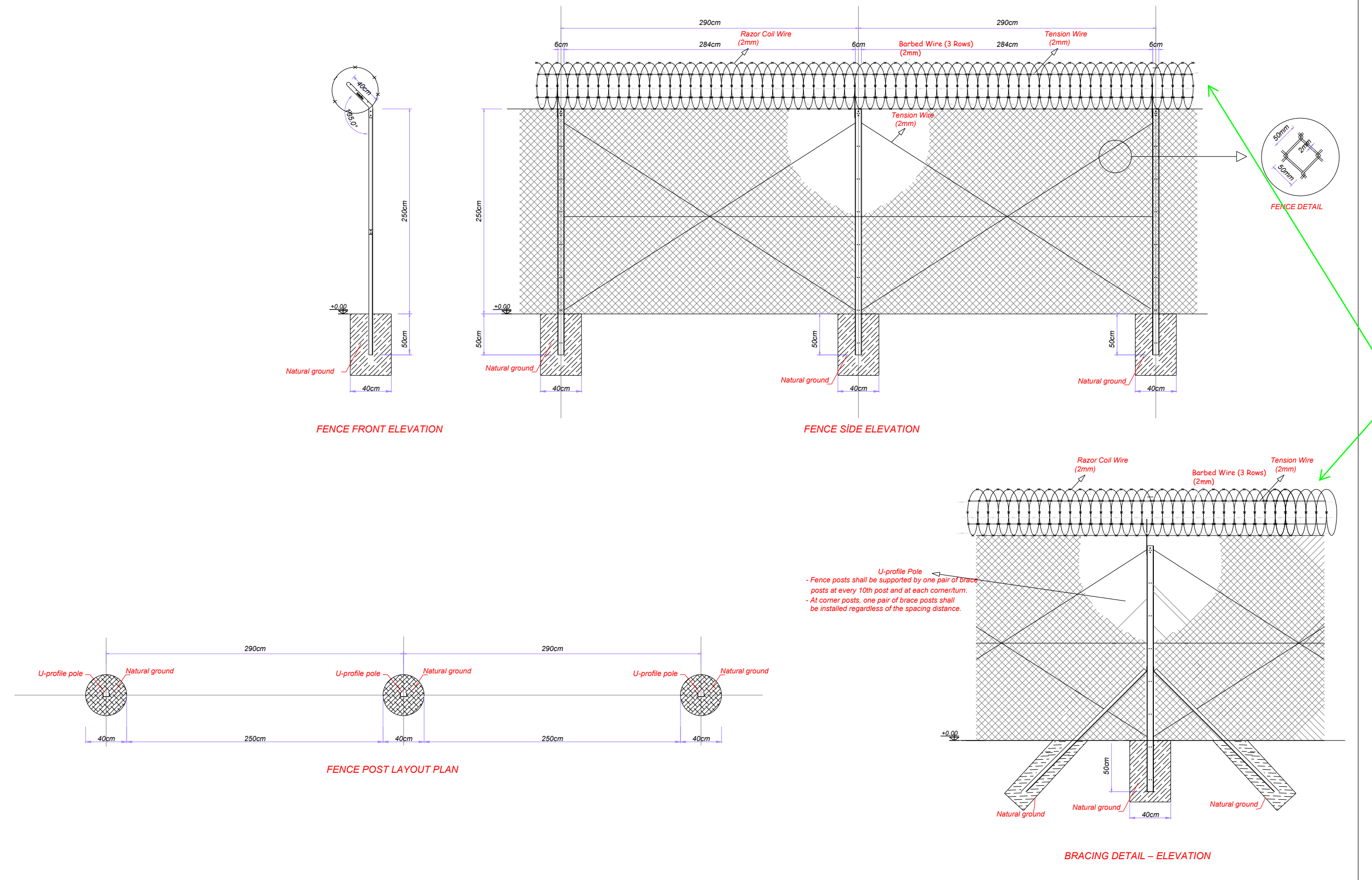
SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	As Indicated	1	30 Oct 25	Issued for Ministry of Works Approval	D.K.	C.U.	M.S.
		0	17 Sep 25	For Construction	D.K.	C.U.	M.S.

DRAWING NUMBER: ABA-ENG-CVL-ARC-0001
SHEET: 1
OF: 1
DRAWING NAME: ACCOMODATION CENTER ARCHITECTURAL DESIGN

Pile-Driving Installation Method

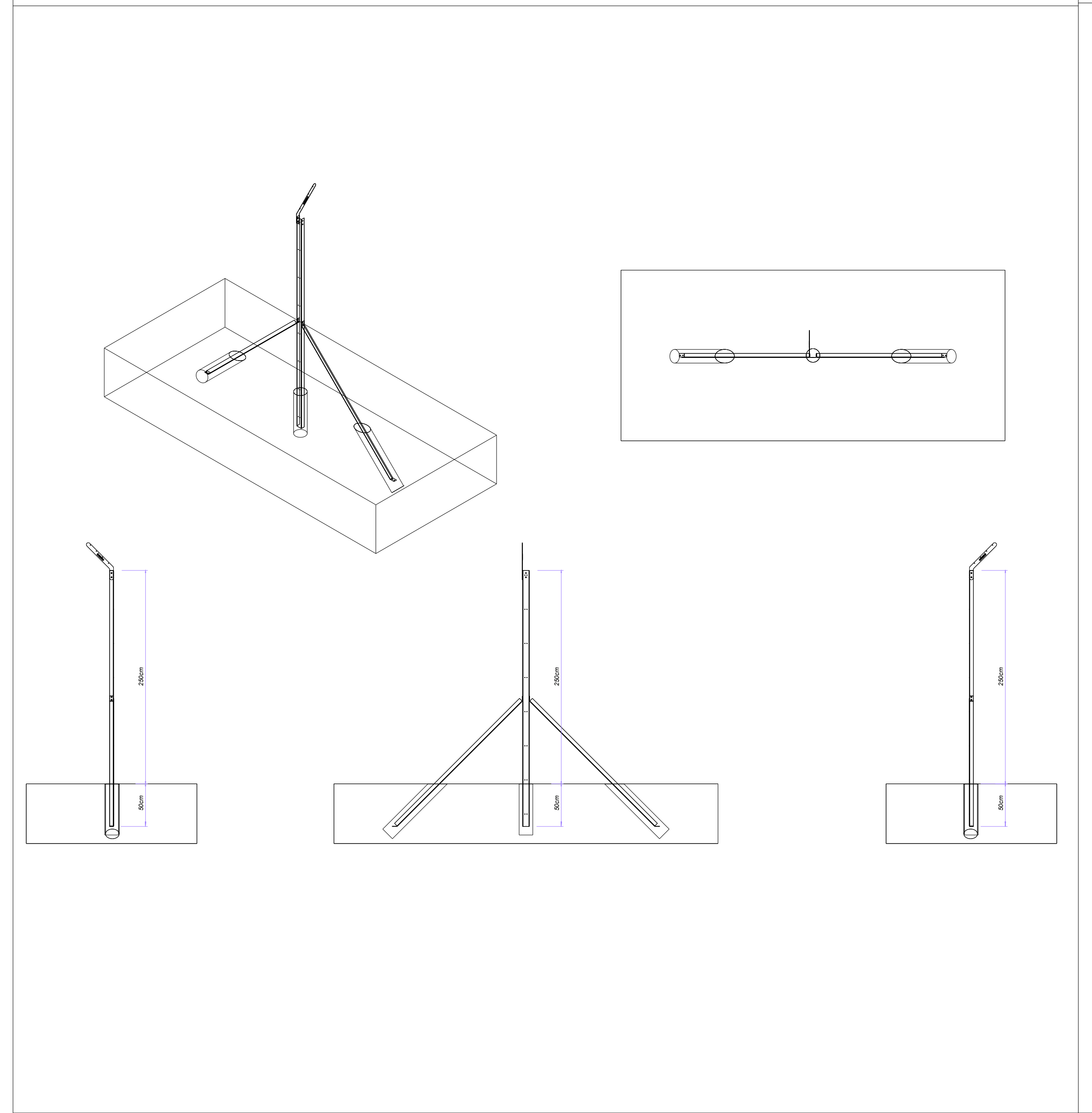

250cm
250cm
250cm

FENCE DETAIL DRAWINGS


290cm
290cm
6cm
284cm
6cm
284cm
6cm
Razor Coil Wire (2mm)
Barbed Wire (3 Rows) (2mm)
Tension Wire (2mm)
Tension Wire (2mm)
40cm
135.0°
250cm
50cm
+0.00
Natural ground
40cm
50mm
2mm
50mm
FENCE DETAIL
FENCE FRONT ELEVATION
FENCE SİDE ELEVATION
U-profile pole
Natural ground
250cm
FENCE POST LAYOUT PLAN
U-profile Pole
- Fence posts shall be supported by one pair of brace posts at every 10th post and at each corner/turn.
- At corner posts, one pair of brace posts shall be installed regardless of the spacing distance.
BRACING DETAIL – ELEVATION

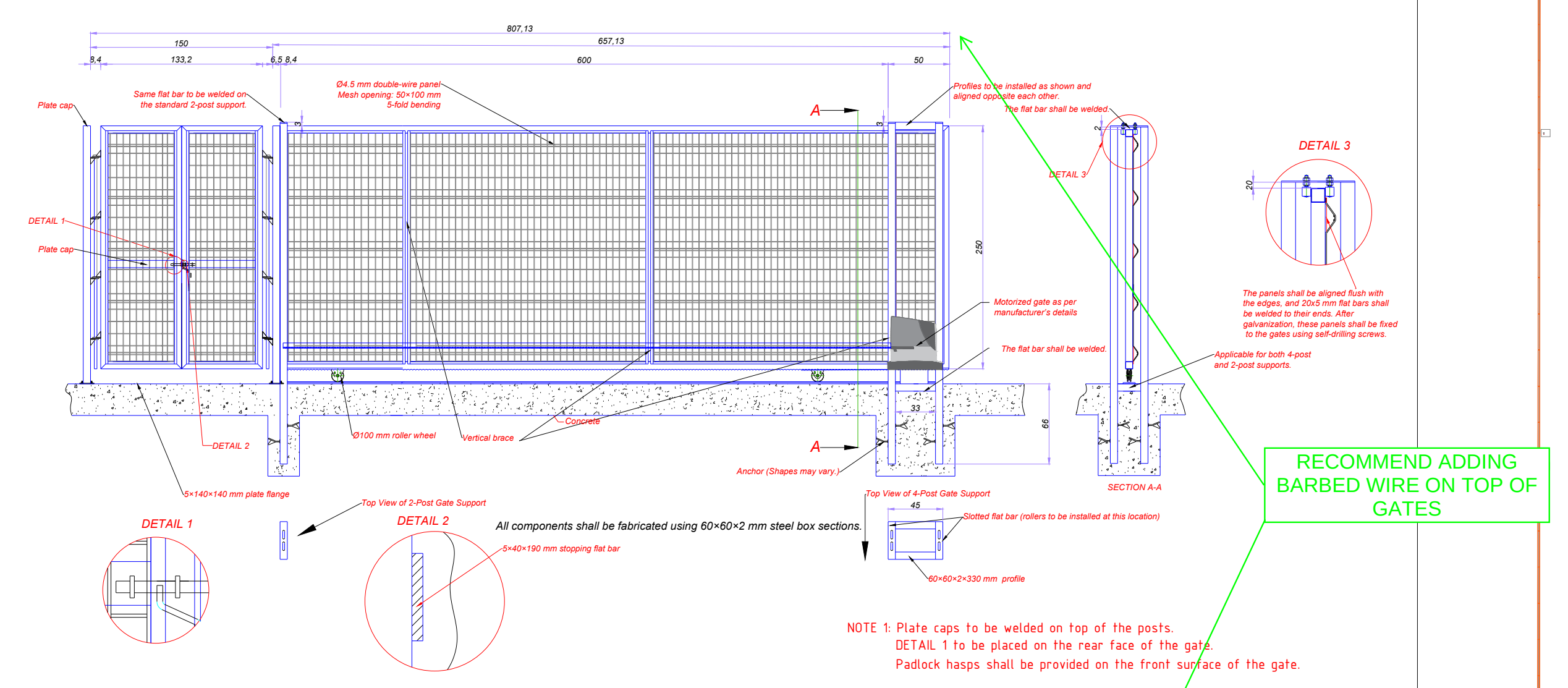
SUGGEST THAT THE COILED RAZOR WIRE MAY NOT BE NECESSARY AND RECOMMEND USING THE 3 ROWS OF BARBED WIRE

Concrete Foundation Application



ENTRANCE GATES AND DETAIL DRAWINGS

Main Entrance Gate Detail Drawings (Pedestrian Entrance and Sliding Gate)

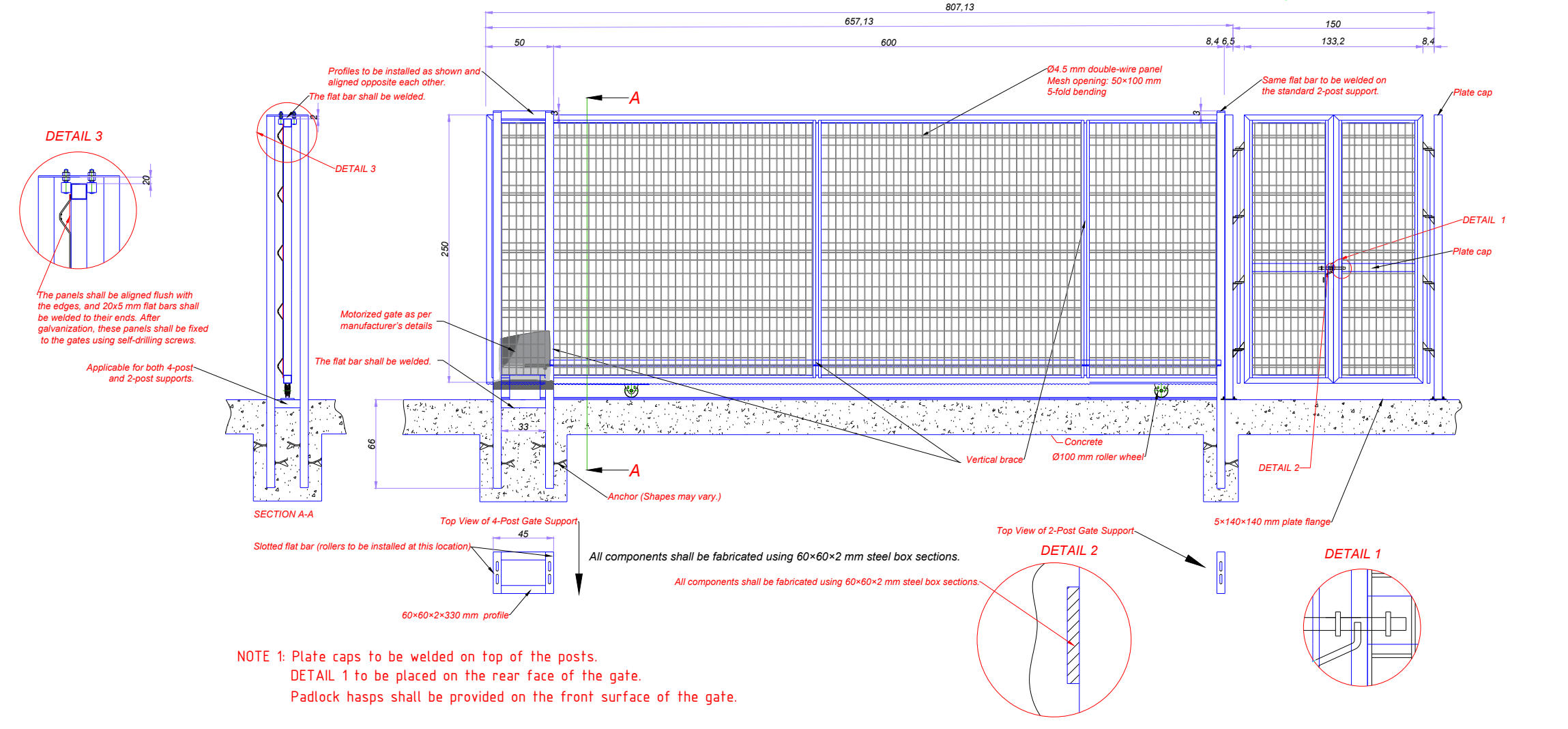

807,13
150
657,13
8,4
133,2
6,5 8,4
600
50
Plate cap
Same flat bar to be welded on the standard 2-post support.
Ø4.5 mm double-wire panel
Mesh opening: 50×100 mm
5-fold bending
Profiles to be installed as shown and aligned opposite each other.
The flat bar shall be welded.
A
DETAIL 1
Plate cap
DETAIL 3
250
Motorized gate as per manufacturer's details
The flat bar shall be welded.
33
66
DETAIL 2
Ø100 mm roller wheel
Vertical brace
Concrete
Anchor (Shapes may vary.)
5×140×140 mm plate flange
SECTION A-A
20
The panels shall be aligned flush with the edges, and 20x5 mm flat bars shall be welded to their ends. After galvanization, these panels shall be fixed to the gates using self-drilling screws.
Applicable for both 4-post and 2-post supports.
Top View of 2-Post Gate Support
Top View of 4-Post Gate Support
45
Slotted flat bar (rollers to be installed at this location)
60×60×2×330 mm profile
5×40×190 mm stopping flat bar

All components shall be fabricated using 60×60×2 mm steel box sections.

NOTE 1: Plate caps to be welded on top of the posts.
DETAIL 1 to be placed on the rear face of the gate.
Padlock hasps shall be provided on the front surface of the gate.

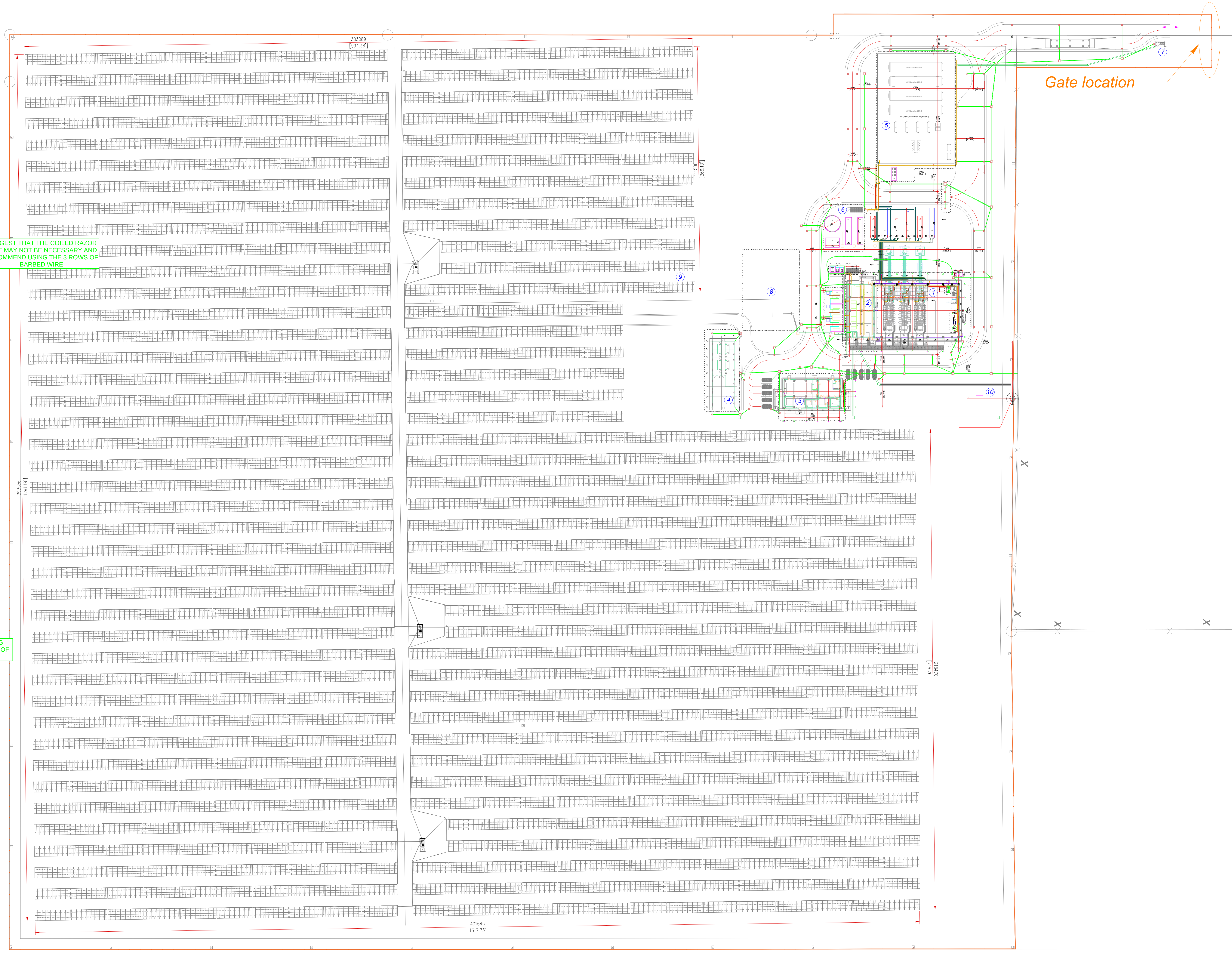
RECOMMEND ADDING BARBED WIRE ON TOP OF GATES

MAIN ENTRANCE GATE DETAIL DRAWINGS (PEDESTRIAN ACCESS & SLIDING GATE)


807,13
657,13
150
50
600
8,4 6,5
133,2
8,4
Profiles to be installed as shown and aligned opposite each other.
The flat bar shall be welded.
DETAIL 3
Ø4.5 mm double-wire panel
Mesh opening: 50×100 mm
5-fold bending
Same flat bar to be welded on the standard 2-post support.
Plate cap
A
DETAIL 1
Plate cap
250
20
The panels shall be aligned flush with the edges, and 20x5 mm flat bars shall be welded to their ends. After galvanization, these panels shall be fixed to the gates using self-drilling screws.
Motorized gate as per manufacturer's details
The flat bar shall be welded.
Applicable for both 4-post and 2-post supports.
33
66
Concrete
Vertical brace
Ø100 mm roller wheel
DETAIL 2
Anchor (Shapes may vary.)
SECTION A-A
Top View of 4-Post Gate Support
45
Slotted flat bar (rollers to be installed at this location)
60×60×2×330 mm profile
Top View of 2-Post Gate Support
5×140×140 mm plate flange
DETAIL 2
DETAIL 1
All components shall be fabricated using 60×60×2 mm steel box sections.

All components shall be fabricated using 60×60×2 mm steel box sections.

NOTE 1: Plate caps to be welded on top of the posts.
DETAIL 1 to be placed on the rear face of the gate.
Padlock hasps shall be provided on the front surface of the gate.


Gate location
393556
[1291.19']

KEY-PLAN

REFERENCE DRAWINGS

LEGEND

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS OTHERWISE NOTED
3. ON-SITE MIXED CONCRETE SHALL BE POURED DIRECTLY INTO THE FENCE POST HOLES.
4. IN THE FIRST ALTERNATIVE, THE INSTALLATION SHALL BE CARRIED OUT USING THE PILE-DRIVING METHOD. IN CASES WHERE THE PILE-DRIVING METHOD CANNOT BE APPLIED, A CONCRETE FOUNDATION APPLICATION SHALL BE USED.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO

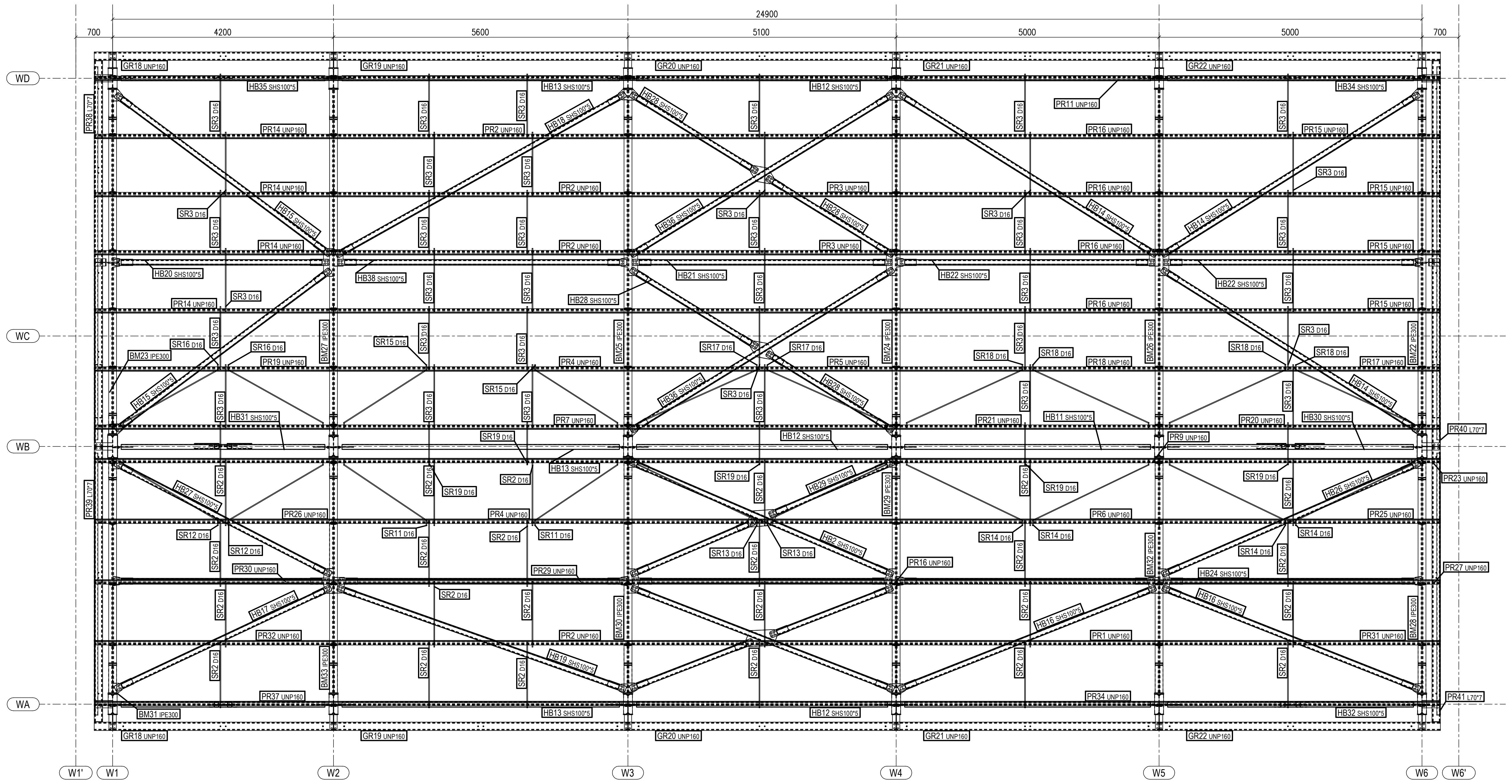
DESIGNER
iLTEKNO SOLAR

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

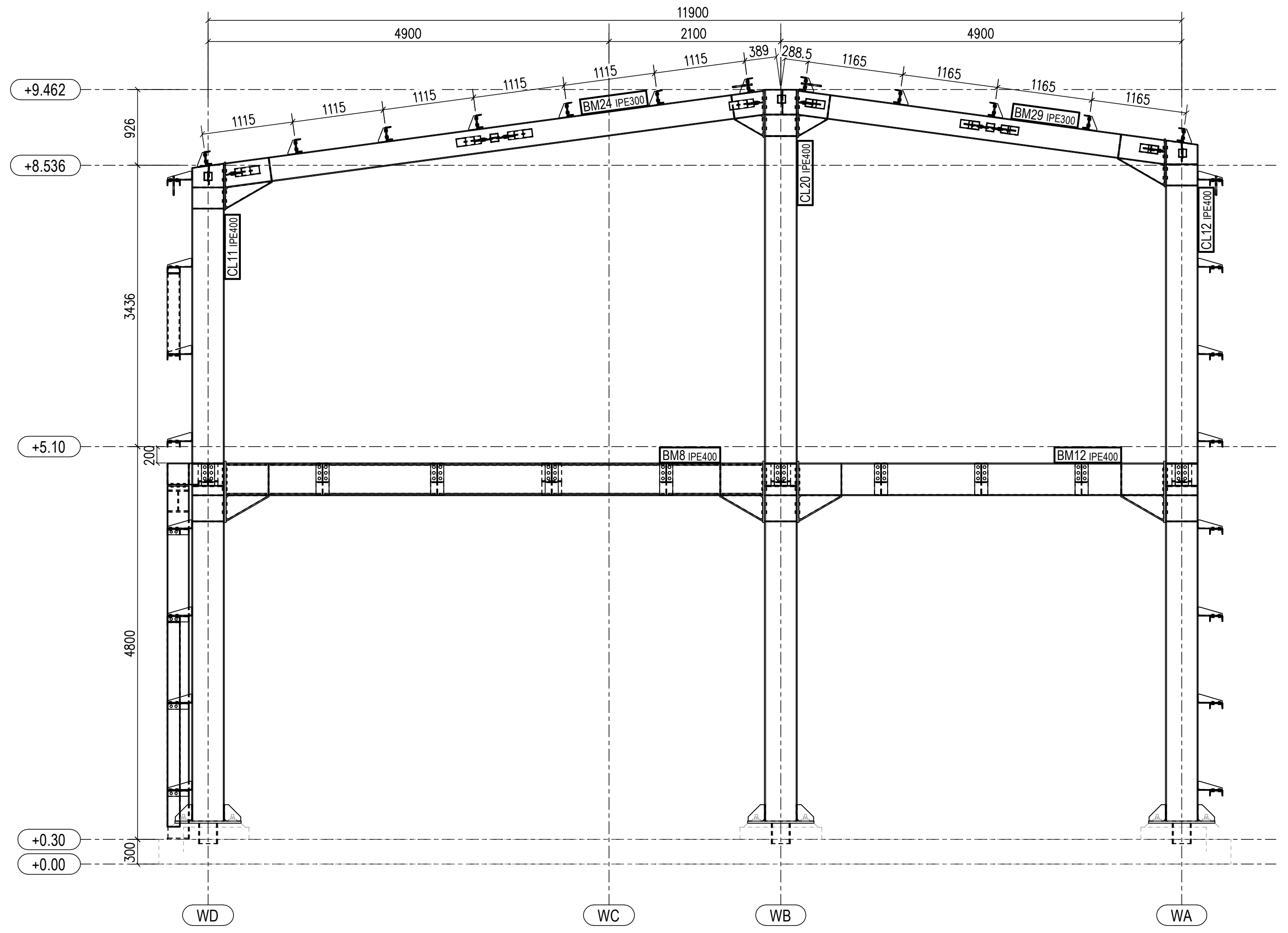
ISSUE OWNER
iLTEKNO SOLAR

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	1:14500	0	26 Dec 25	FOR APPROVAL	O.S	A.Y	T.S

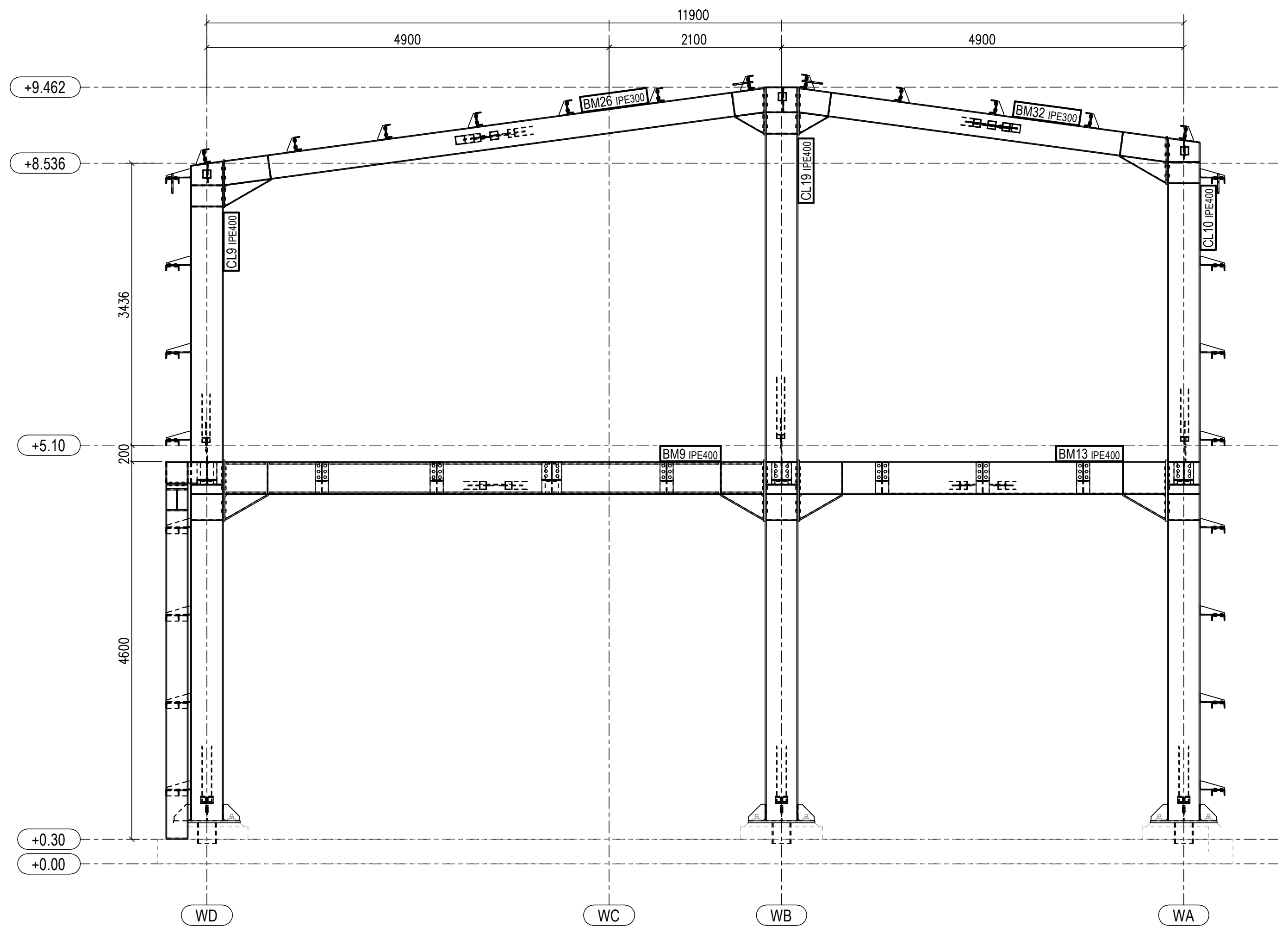
DRAWING NUMBER: ABA-ENG-SLR-DRW-0009
SHEET: 1 OF: 1
DRAWING NAME: Fence and Gate Details



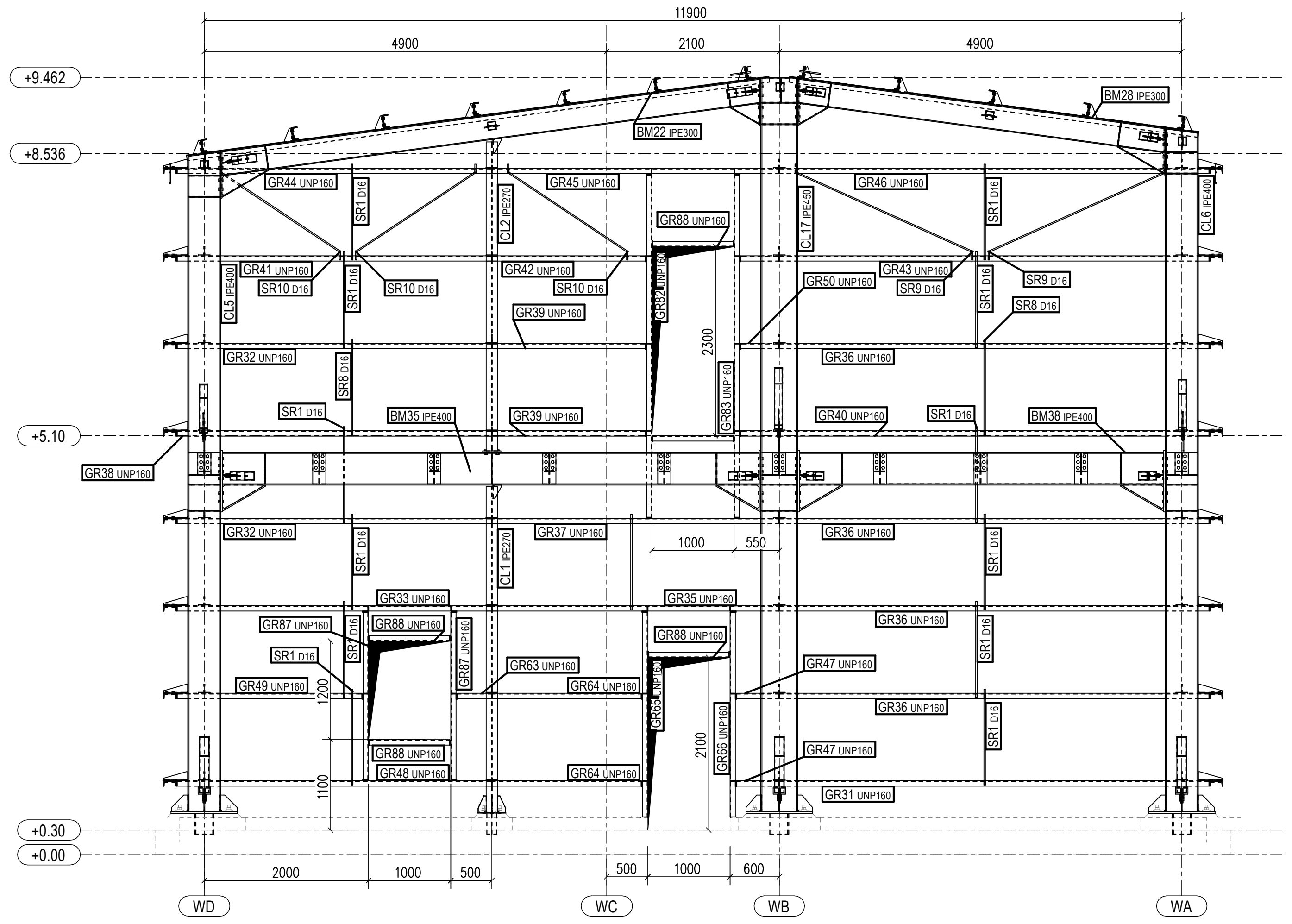
ROOF PLAN
1:50



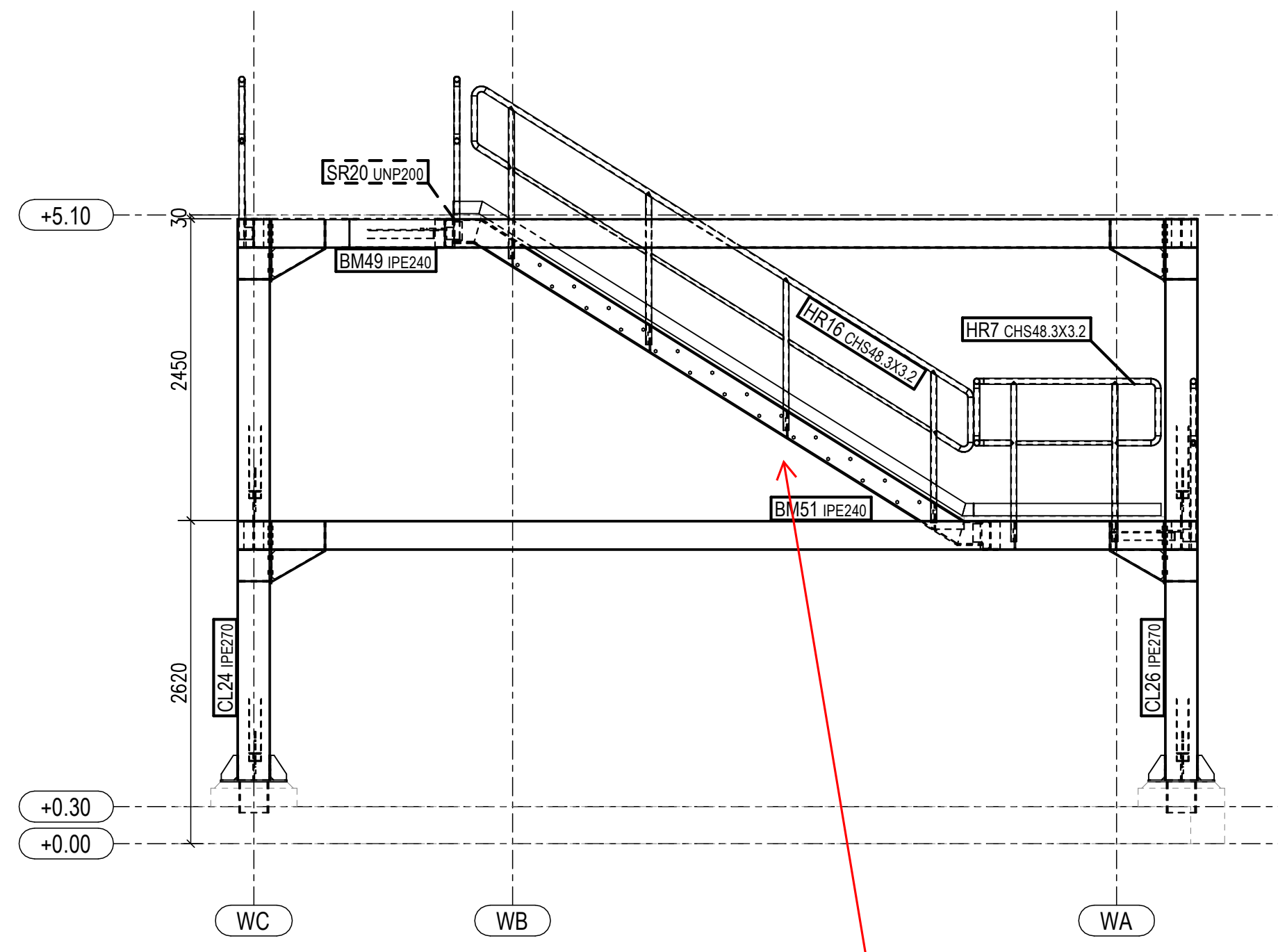
ALIGNMENT W4
1:50



ALIGNMENT W5
1:50

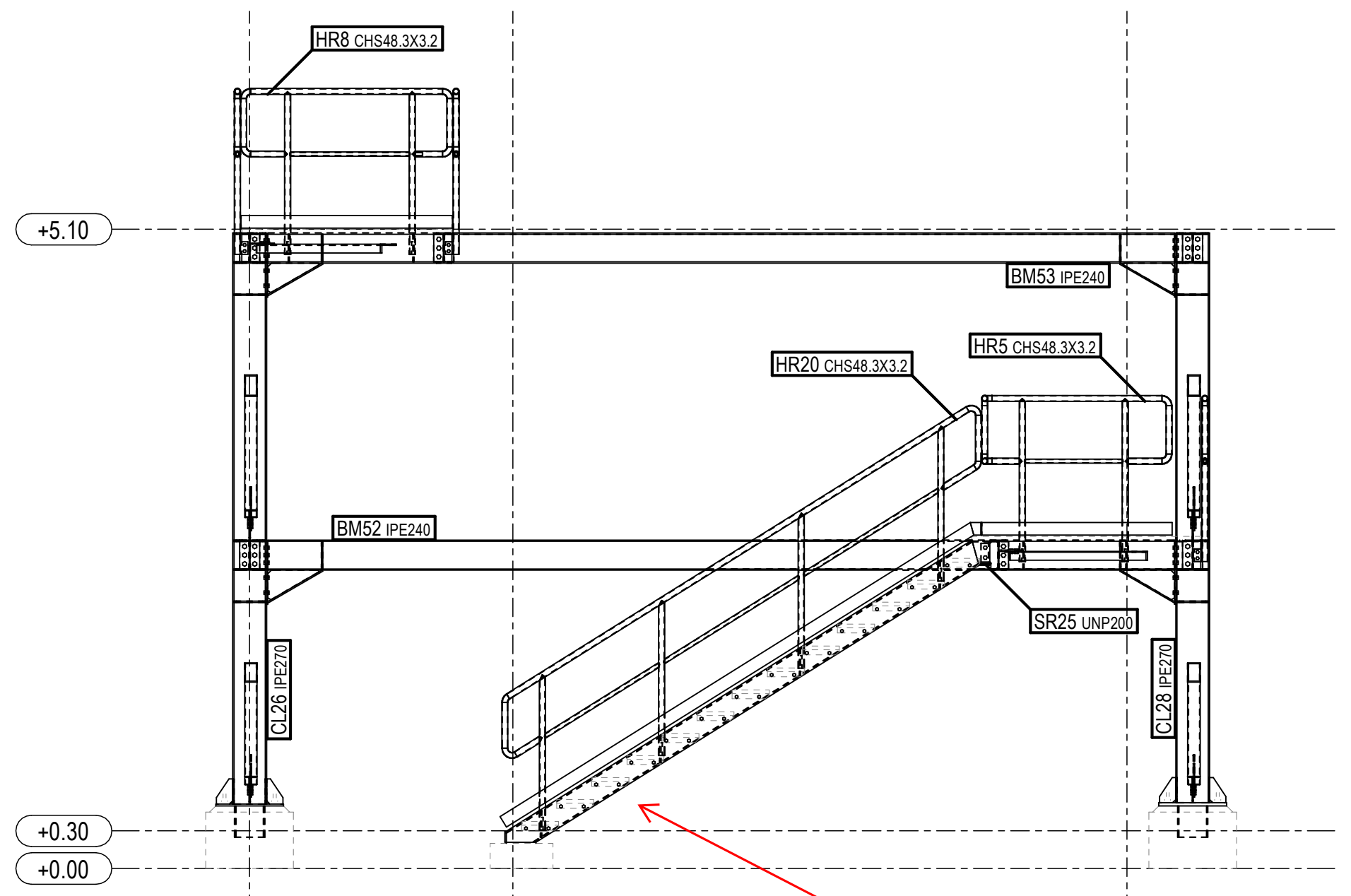


ALIGNMENT W6
1:50



ALIGNMENT W6'
1:50

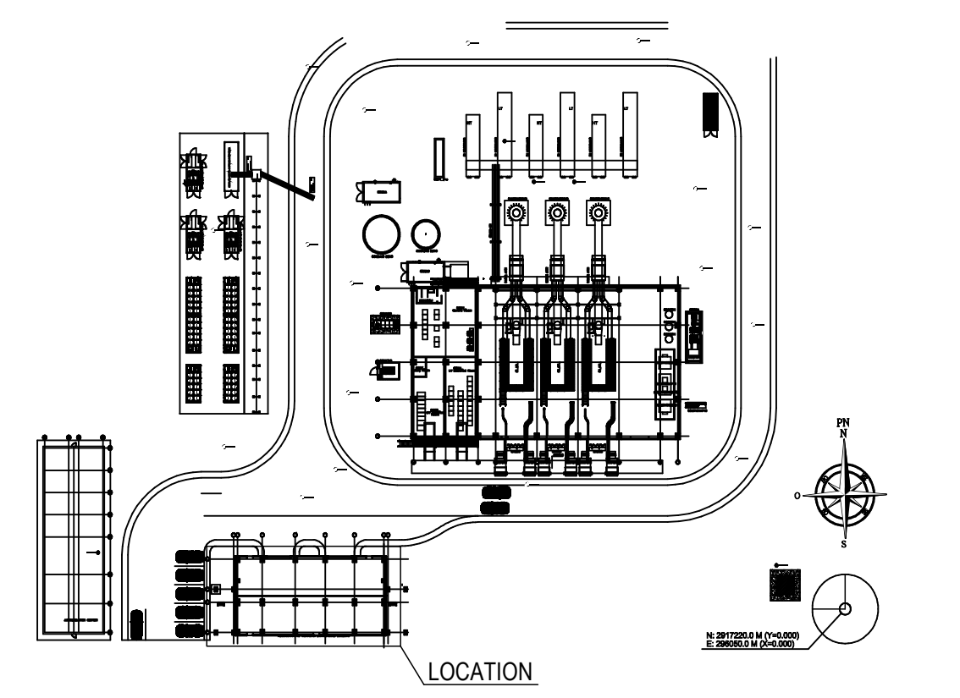
RECOMMEND SHOWING ANGLE OR RISE & RUN AS SHOWN IN ALIGNMENT W1'



ALIGNMENT W6''
1:50

RECOMMEND SHOWING ANGLE OR RISE & RUN AS SHOWN IN ALIGNMENT W1''

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-CVL-DRW-0020 ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING 3D VIEW
ABA-ENG-CVL-DRW-0021 ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING PLAN AT EL. +0.00 , +4.90
ABA-ENG-CVL-DRW-0022 ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING ALIGNMENT WA , WB , WC
ABA-ENG-CVL-DRW-0023 ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING ALIGNMENT WD , W1 , W2 , W3
ABA-ENG-CVL-DRW-0024 ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING ALIGNMENT W4 , W5 , W6 ,ROOF PLAN
ABA-ENG-CVL-DRW-0200-REV.A-ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING FOUNDATION FORMWORK PLAN AND SECTIONS,
ABA-ENG-CVL-DRW-0201-REV.A-ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING GROUND FLOOR FORMWORK PLAN SECTIONS AND DETAILS,
ABA-ENG-CVL-DRW-0202-REV.A-ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING PLINTH FORMWORK,ANCHOR & REBAR DETAILS,
ABA-ENG-CVL-DRW-0203-REV.A-ADMINISTRATIVE WORKSHOP & WAREHOUSE BUILDING FOUNDATION REBAR PLAN & SCHEDULE -1

LEGEND

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS OTHERWISE NOTED
3. HEA, HEB, IPE SECTIONS MATERIAL CLASS WILL BE S275JR EN10025
   HOLLOW, ANGLE, UPN SECTIONS MATERIAL CLASS WILL BE S235JR EN10025
4. STRUCTURAL PLATE MATERIAL USED FOR THE STIFFENING, CONNECTING AND SPLICING OF BUILT-UP AND HOT ROLLED STRUCTURAL SECTIONS WILL MATCH THE MECHANICAL PROPERTIES OF MATERIAL USED FOR THE SECTION
5. ANCHOR MATERIAL CLASS WILL BE 5.6 EN ISO 898-1
6. BOLT, WASHER AND NUT MATERIAL CLASS WILL BE 10.9 EN 14399 (DIN 6914)
7. WELDING SHALL BE IN CONFORMANCE WITH THE FOLLOWING CODES:
   - EUROPEAN STANDARD
   - EN ISO 3834 QUALITY REQUIREMENTS FOR FUSION WELDING OF METALLIC MATERIALS
   - EN ISO 4063 WELDING AND ALLIED PROCESSES - NOMENCLATURE OF PROCESSES AND REFERENCE NUMBERS
   - EN ISO 15609 SPECIFICATION AND QUALIFICATION OF WELDING PROCEDURES FOR METALLIC MATERIALS
   - WELDING PROCEDURE SPECIFICATION
   - EN ISO 15614 SPECIFICATION AND QUALIFICATION OF WELDING PROCEDURES FOR METALLIC MATERIALS
   - WELDING PROCEDURE TEST
   - EN ISO 9692-1 WELDING AND ALLIED PROCESSES - TYPES OF JOINT PREPARATION
   - EN ISO 5817 WELDING - FUSION-WELDED JOINTS IN STEEL, NICKEL, TITANIUM AND THEIR ALLOYS (BEAM WELDING EXCLUDED) - QUALITY LEVELS FOR IMPERFECTIONS
8. ALL WELDS SHALL BE MADE BY QUALIFIED, EXPERIENCED AND CERTIFIED WELDERS IN ACCORDANCE WITH THE REQUIREMENTS OF THE FOLLOWING CODES:
   - EUROPEAN STANDARD
   - EN 287 QUALIFICATION TEST OF WELDERS- EN 719 WELDING COORDINATION. TASKS AND RESPONSIBILITIES.
9. UNLESS OTHERWISE SPECIFIED ON THE TECHNICAL SPECIFICATIONS OR DETAIL DRAWINGS, THE FILLET WELDS SHALL BE ALWAYS PROVIDED, AND THE WELD SIZE WILL NOT EXCEED THE THICKNESS OF THE THINNER PART JOINT PLATE. ALL NON-SPECIFIED FILLET WELD OR INDICATED AS MINIMUM WELD SHOULD BE TAKEN WITH A THROAT SIZE EQUAL TO 0.5 TIMES THE MINIMUM THICKNESS OF THE ELEMENTS TO BE JOINED AND SHAL BE WELDED BY BOTH SIDES. IN CASE OF IMPOSSIBILITY, THE ELEMENT WILL BE WELDED BY JUST ONE SIDE, WITH A THROAT SIZE OF 0.7 TIMES THE MINIMUM THICKNESS OF THE ELMENTS TO BE JOINED. THROAT SIZE SHALL NEVER BE LESS THAN 3 MM
10. FFL: FINISH FLOOR LEVEL
11. TOS: TOP OF STEEL LEVEL

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
A0	1:50

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	24.11.2025	FOR CONSTRUCTION	M.H.	C.U.	M.S.
1	24.09.2025	FOR APPROVAL	M.H.	C.U.	M.S.
0	23.06.2025	FOR APPROVAL	M.H.	C.U.	M.S.

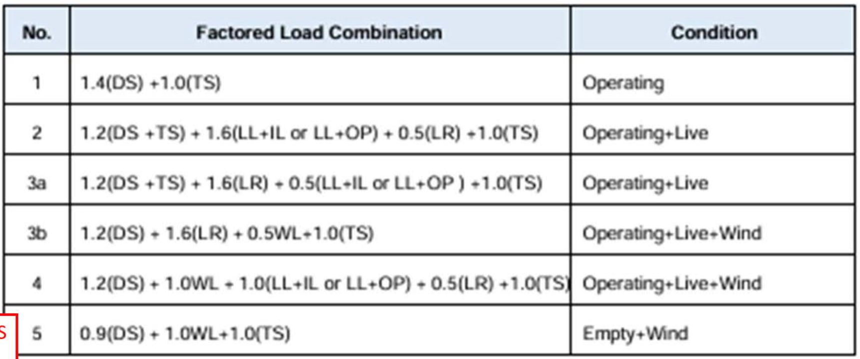
DRAWING NUMBER:
ABA-ENG-CVL-DRW-0024

SHEET:
5
OF:
5

DRAWING NAME:
ADMINISTRATIVE
WORKSHOP&WAREHOUSE BUILDING
ALIGNMENT W4 , W5 , W6 , W6' , W6" ,R***

7. LOAD COMBINATIONS

Ultimate limit state load combination based on LRFD approach which is considered in designing section of the structural members are listed below.

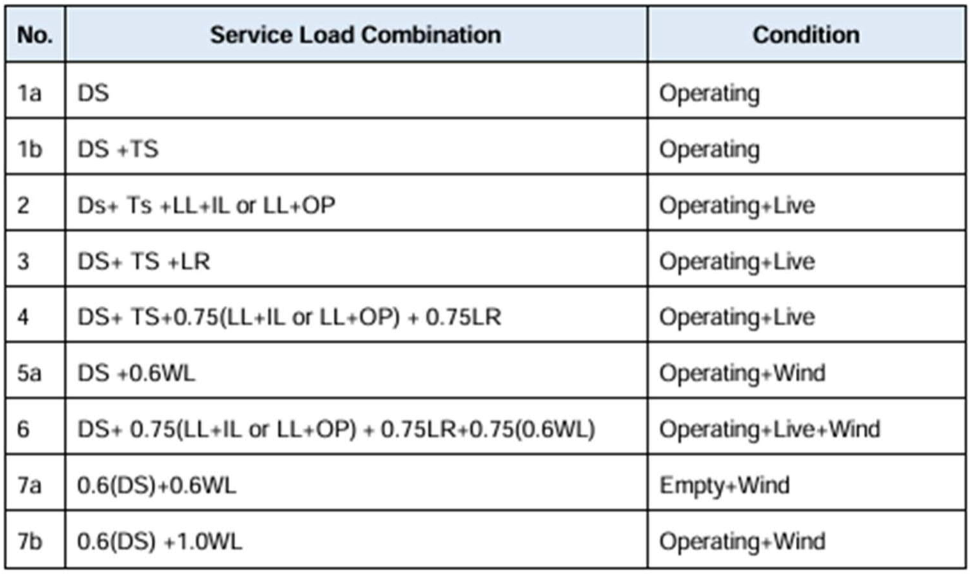


No.	Factored Load Combination	Condition
1	1.4(DS) +1.0(TS)	Operating
2	1.2(DS +TS) + 1.6(LL+IL or LL+OP) + 0.5(LR) +1.0(TS)	Operating+Live
3a	1.2(DS +TS) + 1.6(LR) + 0.5(LL+IL or LL+OP) +1.0(TS)	Operating+Live
3b	1.2(DS) + 1.6(LR) + 0.5WL+1.0(TS)	Operating+Live+Wind
4	1.2(DS) + 1.0WL + 1.0(LL+IL or LL+OP) + 0.5(LR) +1.0(TS)	Operating+Live+Wind
5	0.9(DS) + 1.0WL+1.0(TS)	Empty+Wind

THERE ARE SEISMIC LOADS IN THE DESIGN CRITERIA BUT NO SEISMIC COMBINATIONS

Figure 68 – ULS Combination List

Serviceability limit state load combination based on LRFD approach which is considered in checking stability efforts of the structural system are listed below.



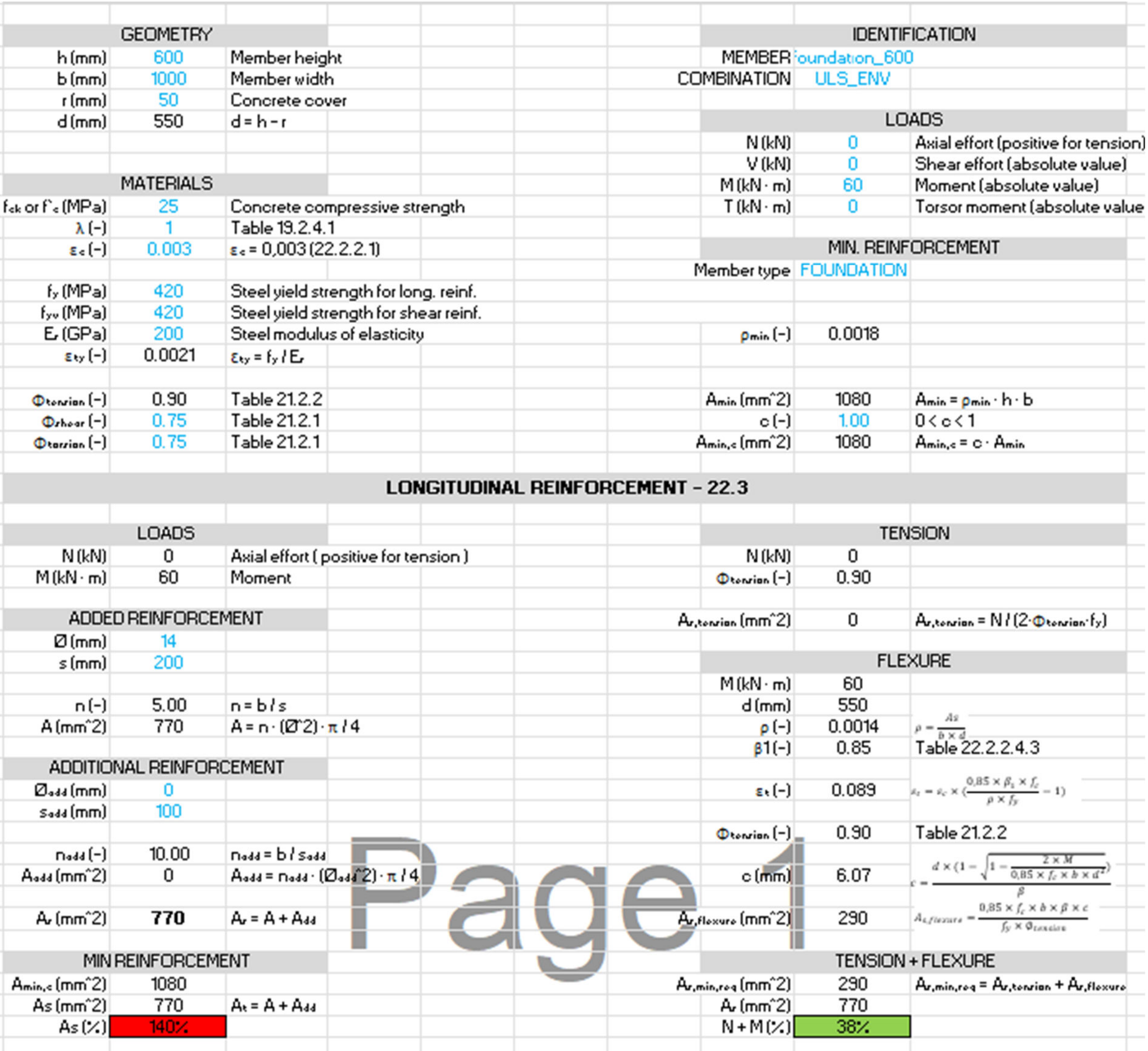
No.	Service Load Combination	Condition
1a	DS	Operating
1b	DS +TS	Operating
2	Ds+ Ts +LL+IL or LL+OP	Operating+Live
3	DS+ TS +LR	Operating+Live
4	DS+ TS+0.75(LL+IL or LL+OP) + 0.75LR	Operating+Live
5a	DS +0.6WL	Operating+Wind
6	DS+ 0.75(LL+IL or LL+OP) + 0.75LR+0.75(0.6WL)	Operating+Live+Wind
7a	0.6(DS)+0.6WL	Empty+Wind
7b	0.6(DS) +1.0WL	Operating+Wind

Figure 69 – SLS Combination List

For h=60 cm foundations :

Short way direction :

Chosen main top and bottom rebar : ϴ14/20 (7.7cm^2/1m)



GEOMETRY		
h (mm)	600	Member height
b (mm)	1000	Member width
r (mm)	50	Concrete cover
d (mm)	550	d = h - r
MATERIALS		
f_{ck} or f'c (MPa)	25	Concrete compressive strength
λ (-)	1	Table 19.2.4.1
ε_c (-)	0.003	ε_c = 0,003 (22.2.2.1)
f_y (MPa)	420	Steel yield strength for long. reinf.
f_{yv} (MPa)	420	Steel yield strength for shear reinf.
E_s (GPa)	200	Steel modulus of elasticity
ε_{ty} (-)	0.0021	$\varepsilon_{ty} = f_y / E_s$
$\Phi_{tension}$ (-)	0.90	Table 21.2.2
Φ_{shear} (-)	0.75	Table 21.2.1
$\Phi_{torsion}$ (-)	0.75	Table 21.2.1

IDENTIFICATION		
MEMBER	foundation_600	
COMBINATION	ULS_ENV	
LOADS		
N (kN)	0	Axial effort (positive for tension)
V (kN)	0	Shear effort (absolute value)
M (kN · m)	60	Moment (absolute value)
T (kN · m)	0	Torsor moment (absolute value
MIN. REINFORCEMENT		
Member type	FOUNDATION	
ρ_{min} (-)	0.0018	
A_{min} (mm^2)	1080	$A_{min} = \rho_{min} \cdot h \cdot b$
c (-)	1.00	0 < c < 1
$A_{min,c}$ (mm^2)	1080	$A_{min,c} = c \cdot A_{min}$

LONGITUDINAL REINFORCEMENT - 22.3

LOADS		
N (kN)	0	Axial effort (positive for tension)
M (kN · m)	60	Moment
ADDED REINFORCEMENT		
Ø (mm)	14	
s (mm)	200	
n (-)	5.00	n = b / s
A (mm^2)	770	A = n · (Ø^2) · π / 4
ADDITIONAL REINFORCEMENT		
$Ø_{add}$ (mm)	0	
s_{add} (mm)	100	
n_{add} (-)	10.00	$n_{add} = b / s_{add}$
A_{add} (mm^2)	0	$A_{add} = n_{add} \cdot (Ø_{add}^2) \cdot \pi / 4$
A_s (mm^2)	**770**	$A_s = A + A_{add}$
MIN REINFORCEMENT		
$A_{min,c}$ (mm^2)	1080	
As (mm^2)	770	$A_s = A + A_{add}$
As (%)	🟥 140%	

TENSION		
N (kN)	0	
$\Phi_{tension}$ (-)	0.90	
$A_{s,tension}$ (mm^2)	0	$A_{s,tension} = N / (2 \cdot \Phi_{tension} \cdot f_y)$
FLEXURE		
M (kN · m)	60	
d (mm)	550	
ρ (-)	0.0014	$\rho = \frac{As}{b \times d}$
β1 (-)	0.85	Table 22.2.2.4.3
ε_t (-)	0.089	$\varepsilon_t = \varepsilon_c \times (\frac{0{,}85 \times \beta_1 \times f_c}{\rho \times f_y} - 1)$
$\Phi_{tension}$ (-)	0.90	Table 21.2.2
c (mm)	6.07	$c = \frac{d \times (1 - \sqrt{1 - \frac{2 \times M}{0{,}85 \times f_c \times b \times d^2}})}{\beta}$
$A_{s,flexure}$ (mm^2)	290	$A_{s,flexure} = \frac{0{,}85 \times f_c \times b \times \beta \times c}{f_y \times \Phi_{tension}}$
TENSION + FLEXURE		
$A_{s,min,req}$ (mm^2)	290	$A_{s,min,req} = A_{s,tension} + A_{s,flexure}$
A_s (mm^2)	770	
N + M (%)	🟩 38%	

**See Section 5.3 for the minimum reinforcement amount.

RECOMMEND VERIFYING REBAR REINFORCEMENT RATIOS GREATER THAN 100%

Section 4 - Electrical

DOCUMENT REVIEW

ECF DCN:	FI-VC-0026-1
Document No.:	FI-VC-0026-1
Document Subject / Title:	ABACO-60% Design Resubmittal - Electrical
Document Submission Date:	2-26-26
Document Submitted By:	EA Energy
Document Submitted For:	Review
Review Due Date:	3-25-26
Reviewer's Name:	Joe Chau
Review Submission Date:	3-20-26
Review Stamp:	Accepted with Comments for next Design Submittal Phase _ No Resubmittal Required

Comments:

1. **ATTACHMENT-12-DRAWINGS**

1.1 ELECTRICAL:

1.1.1 ADMIN.

-ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS.

-ABA-ENG-DRW-2201-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING PLANS: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING PLAN-1 AND -2.

- ABA-ENG-DRW-2205-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SOCKET PLAN: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SOCKET PLAN-1 AND -2.

-ABA-ENG-DRW-2206-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY PLAN: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SOCKET PLAN-1, -2 AND -3.

- ABA-ENG-DRW-2208-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PLANS: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PLAN-1, -2, -3 AND -4.

- ABA-ENG-DRW-2209-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-

ARCH-E: ABA-ENG-DRW-2207-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM-1 AND -2.

1.1.2 Bable Route Plan.

-ABA-ENG-ELC-DRW-2130-1-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-1-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-2-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-2-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-3-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-3-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-4-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-4-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-5-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-5-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-6-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-6-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-7-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-7-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-8-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-8-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-9-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-9-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-10-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-10-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-11-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-11-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-12-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-

ENG-ELC-DRW-2130-12-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-13-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-13-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-14-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-14-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-15-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-15-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.
-ABA-ENG-ELC-DRW-2130-16-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-2130-16-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout 1.

1.1.3 FENCE CCVT LAYOUT-SPECIFICATION
- ABA-ENG-ELC-DRW-3110-REV.1-FENCE CCVT SYSTEM LAYOUT & RISER DRAWING: THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER PDF-ARCH-E: ABA-ENG-ELC-DRW-3110-REV.1-FENCE CCVT SYSTEM LAYOUT & RISER DRAWING-LAYOUT.

1.1.4 MACHINE HALL:
-ABA-ENG-ELC-DRW-2306-REV.0-MACHINE HALL AND ELECTRICAL & CONTROLBUILDING FOUNDATIION GROUNDING PLANS: PROVIDE AT LEAST 2 GROUNDING CONNECTIONS TO THE ADMIN BUILDING AND WAREHOUSE BUILDING.
-ABA-ENG-ELC-DRW-2306-REV.0-PRIMARY EQUIPMENT SIZING CALCULATIONS:SECTION 6.1.5 SPP FEEDER: SHOULD THIS SECTION BE A08?
-ABA-ENG-ELC-LST-2120-REV.0-MV CABLE LIST:MISSING MV CABLE FOR BESS AND SOLAR PV SYSTEM.
-ABA-ENG-ELC-SLD-0001-REV.4-PLANT SINGLE LINE DRAWING (MVLV):DEFINE WCPS?
REFER TO INTERCONNECTION AGREEMENT FOR CLARITY ON WHO FURNISH, WHO INSTALL THE MV INTERCONNECTION CABLES. SHOW THE CABLE ID/NUMBER ON THE DRAWINGS.

2. ATTACHMENT-13-TECHNICAL SPECIFICATIONS AND BOMS

2.1 TECHNICAL DOCUMENTATION:
2.1.1 3- SINGLE LINE DIAGRAMS:
-ABA-ENG-ELC-SLD-0001_3PLANT SINGLE LINE DRAWING (MVLV)-Model: SAME DRAWING AS SHOWN IN ATTACHMENT 12-DRAWINGS-ELECTRICAL SECTION. IT SHOULD BE SHOWN ONLY ONCE SO AS NOT TO CONFUSE: WHICH ONE IS TOBE USED FOR THE PROJECT?
2.1.2 2.7.2 BILL OF MATERIAL:
2.7.1.3: BESS AND SOLAR SYSTEM:
XCEL FILE: 2.7.1.3 BoM Solar & BESS: Item # 5: SOLAR PLANT STS: QUANTITY OF TRANSFORMERS FOR THE SOLAR GENERATION IS INCORRECT, SEE ONE LINE DIAGRAM: ABA-ENG-SLD-0004-SINGLE LINE DIAGRAM FOR T

SOLAR PLANT TRANSFORMERS DESIGN.

3. MISC.

ATTACHMENT 11: - PRELIMINARY SAFETY PROTOCOLS AND EMERGENCY SHUTDOWN PROCEDURES-Abaco: Section 5.4 Emergency Shutdown (ESD): add reference to manual PB located at LNG plant, at Power Generation Area.

END

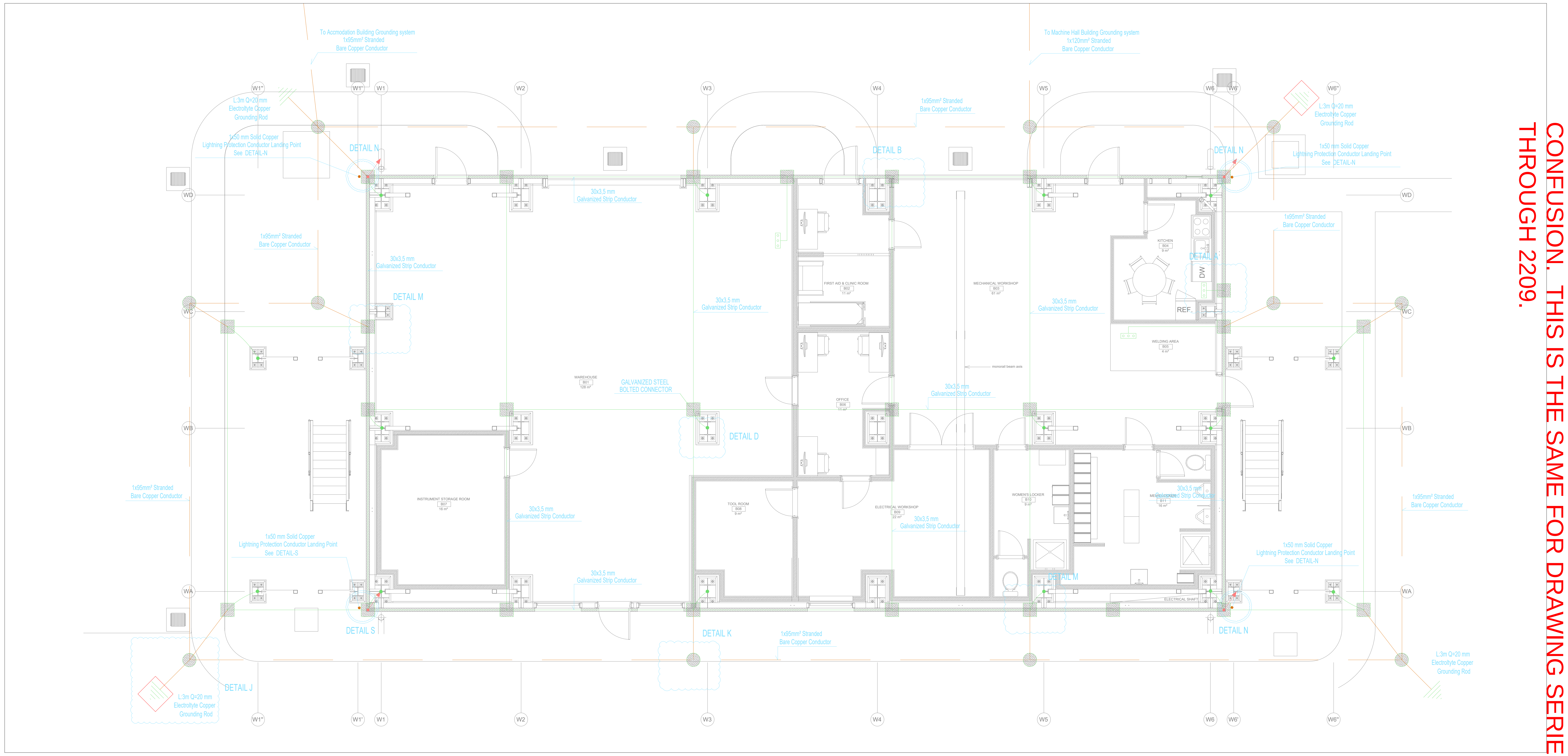
DOCUMENT REVIEW

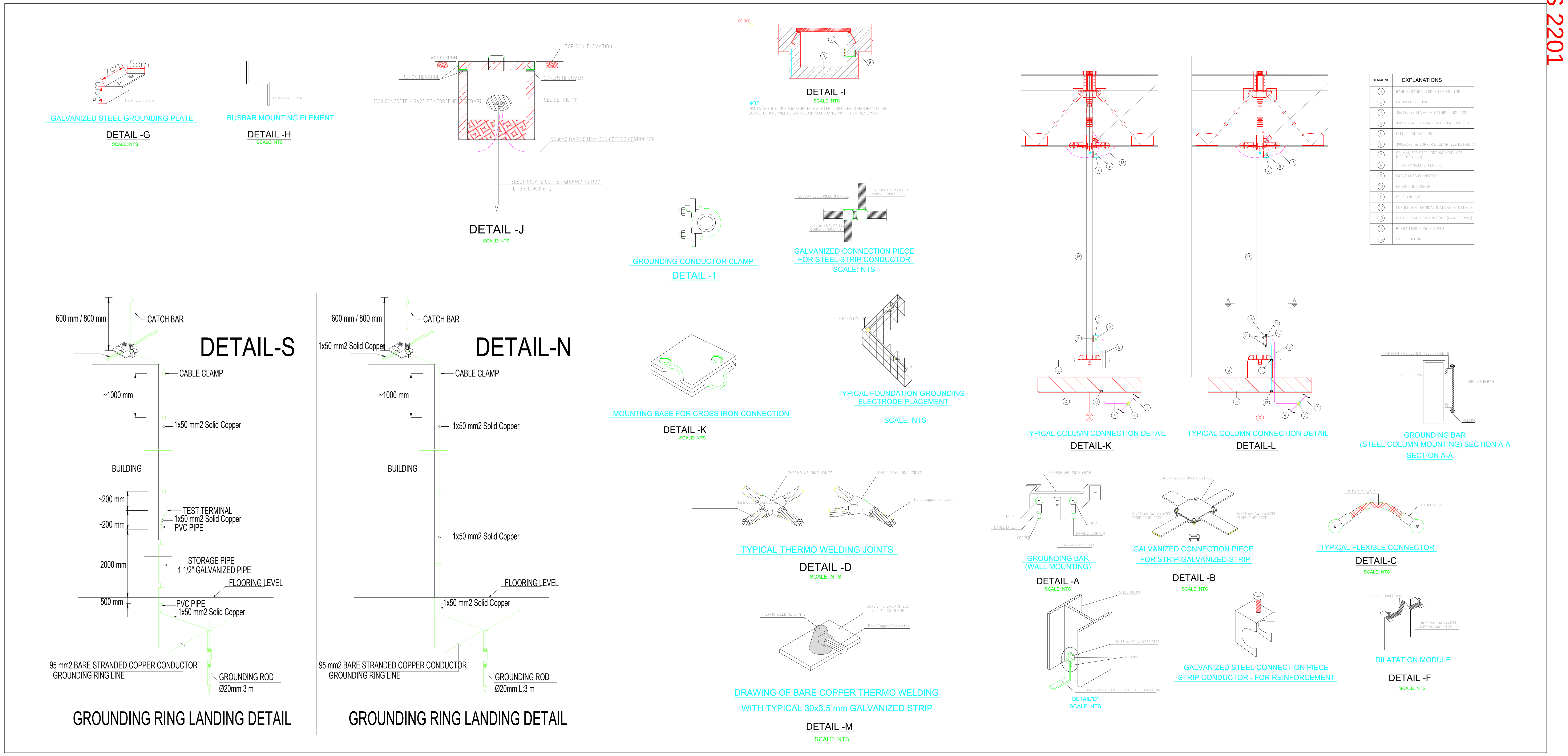
ECF DCN:	FI-VC-0026-1
Document No.:	FI-VC-0026-1
Document Subject / Title:	Abaco 60% Design Resubmittal – Electrical
Document Submission Date:	2-26-26
Document Submitted By:	EA Energy
Document Submitted For:	Review
Review Due Date:	3/20/2026
Reviewer's Name:	Pabalinas
Review Submission Date:	3/20/2026
Review Stamp:	Accepted with Comments for next Design Submittal Phase _ No Resubmittal Required

Comments:

1. ABA-ENG-ELC-SLD-0001-REV.4-PLANT SINGLE LINE DRAWING (MVLV) - Rating is inconsistent with ABA-ENG-ELC-SLD-0001. Specs do not match with Global_Bahamas_Technical Specification & Schedules_R00.docx. i.e. % impedance value. 3.3.6 of Global_Bahamas_Technical Specification & Schedules_R00.docx states that voltage of the blackstart generator is 400 /230 VAC. Does not match with specs in 3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx. Add proper labeling of panels. Show how Admin and Machine hall panels labels too.
2. 25 A 10 Sec 319 Ohm NGR Technical Documents - 3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx specified 796 ohms
3. 1000 A 10 Sec 19,9 Ohm NGR Technical Documents - 3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx specified 796 ohms
4. ABA-ENG-ESS-DRW-0003_v1 - Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah
5. ABA-ENG-ESS-DRW-0004 - ABA-ENG-ESS-DRW-0003_v1 shows 1 DTS per PCS. Do not align with Luna2000-213KTL.pdf i.e. Model: LUNA2000-213KTL-H0
6. Attachment.04-Electrical Work BoQ – Incomplete BoQ
7. ABA-ENG-ESS-CAL-0001- DC CABLE CALCULATIONS – Missing attachments; LUNA2000-5015 2507 Short-circuit Current Design Document and Sample Cable Datasheet
8. ABA-ENG-ESS-DRW-0003 - SINGLE LINE DIAGRAM - Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah. Missing line going to SACU. Double check cable from LV Panel to Transformer
9. ABA-ENG-ESS-DRW-0004 - BESS GENERAL LAYOUT – Provide cable labels

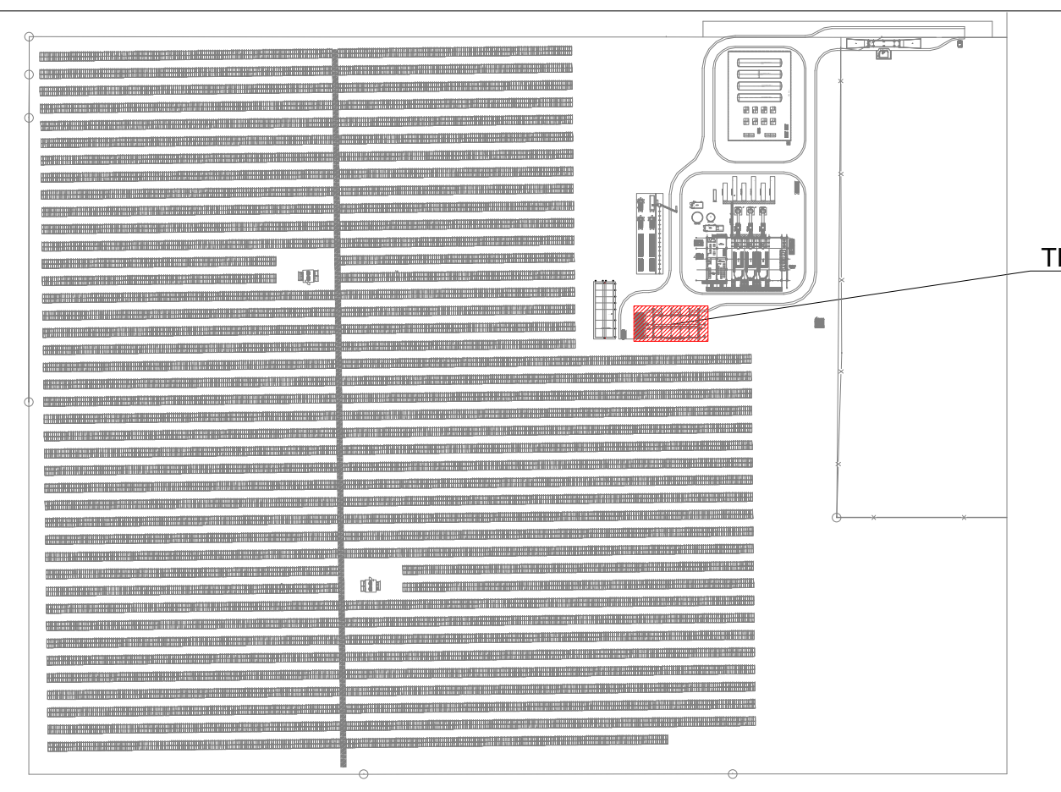
10. ABA-ENG-SLR-DRW-0004-SINGLE LINE DIAGRAM - Double check cable from LV Panel to Transformer. Fix number description i.e. 50 is Instantaneous Overcurrent Relay and 51 is Ac Time Overcurrent Relay. Inverter model is SUN2000-330KTL-H1


DETAIL N
DETAIL B
DETAIL M
DETAIL D
DETAIL S
DETAIL K
DETAIL J
DETAIL L
W1'
W1
W2
W3
W4
W5
W6
W6'
WD
WC
WB
WA
1x95mm² Stranded Bare Copper Conductor
30x3,5 mm Galvanized Strip Conductor
L:3m Q=20 mm Electrolyte Copper Grounding Rod
1x50 mm Solid Copper Lightning Protection Conductor Landing Point See: DETAIL-N
1x50 mm Solid Copper Lightning Protection Conductor Landing Point See: DETAIL-S
GALVANIZED STEEL BOLTED CONNECTOR
To Accomodation Building Grounding system 1x95mm² Stranded Bare Copper Conductor
To Machine Hall Building Grounding system 1x120mm² Stranded Bare Copper Conductor
DW
REF.


GALVANIZED STEEL GROUNDING PLATE
DETAIL -G
SCALE: NTS
BUSBAR MOUNTING ELEMENT
DETAIL -H
SCALE: NTS
DETAIL -J
SCALE: NTS
DETAIL -I
SCALE: NTS
GROUNDING CONDUCTOR CLAMP
DETAIL -1
GALVANIZED CONNECTION PIECE FOR STEEL STRIP CONDUCTOR
SCALE: NTS
MOUNTING BASE FOR CROSS IRON CONNECTION
DETAIL -K
SCALE: NTS
TYPICAL FOUNDATION GROUNDING ELECTRODE PLACEMENT
SCALE: NTS
TYPICAL COLUMN CONNECTION DETAIL
DETAIL-K
TYPICAL COLUMN CONNECTION DETAIL
DETAIL-L
SERIAL NO
EXPLANATIONS
GROUNDING BAR (STEEL COLUMN MOUNTING) SECTION A-A
SECTION A-A
TYPICAL THERMO WELDING JOINTS
DETAIL -D
SCALE: NTS
GROUNDING BAR (WALL MOUNTING)
DETAIL -A
SCALE: NTS
GALVANIZED CONNECTION PIECE FOR STRIP-GALVANIZED STRIP
DETAIL -B
SCALE: NTS
TYPICAL FLEXIBLE CONNECTOR
DETAIL -C
SCALE: NTS
DRAWING OF BARE COPPER THERMO WELDING WITH TYPICAL 30x3.5 mm GALVANIZED STRIP
DETAIL -M
SCALE: NTS
DETAIL "E"
SCALE: NTS
GALVANIZED STEEL CONNECTION PIECE STRIP CONDUCTOR - FOR REINFORCEMENT
DILATATION MODULE
DETAIL -F
SCALE: NTS
DETAIL-S
600 mm / 800 mm
CATCH BAR
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
~200 mm
TEST TERMINAL
1x50 mm2 Solid Copper
PVC PIPE
~200 mm
2000 mm
STORAGE PIPE
1 1/2" GALVANIZED PIPE
FLOORING LEVEL
500 mm
PVC PIPE
1x50 mm2 Solid Copper
95 mm2 BARE STRANDED COPPER CONDUCTOR GROUNDING RING LINE
GROUNDING ROD
Ø20mm 3 m
GROUNDING RING LANDING DETAIL
DETAIL-N
600 mm / 800 mm
1x50 mm2 Solid Copper
CATCH BAR
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
1x50 mm2 Solid Copper
FLOORING LEVEL
1x50 mm2 Solid Copper
95 mm2 BARE STRANDED COPPER CONDUCTOR GROUNDING RING LINE
GROUNDING ROD
Ø20mm L:3 m
GROUNDING RING LANDING DETAIL

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E:
ABA-ENG-ELC-DRW-2207-REV.1-ADMINISTRATION WORKSHOP
AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS.
SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE
CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201
THROUGH 2209.

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-CAL-2206 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING EARTHING CALCULATION
ABA-ENG-ELC-DRW-2208 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTINING PROTECTION PLAN

LEGEND

SYMBOL LIST	
○ ○ ○	Equipotential Busbars tinned - cooppers will have 3 holes.
🟩	30x3,5 mm Galvanized Strip Conductor
🟧	1x95mm² Stranded Bare Copper Conductor
●	Cadvelt source
▨	Galvanized Steel Bolted Connector
☰	L:3m Q=20 mm Electroltyte Copper Grounding Rod
🟥	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING. CADWELD WELDING SHALL BE USED ONLY FOR Cu-Cu INTERCONNECTION.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
10. ALL STEEL COLUMNS WILL BE GROUNDED USING BRANCHES TAKEN FROM THE GROUNDING CONDUCTOR AT THEIR FOUNDATIONS. ALL STEEL COMPONENTS, EXCEPT FOR THE MAIN STEEL COLUMNS OF THE BUILDING, PLATFORM CARRYING COLUMNS, STEEL PLATFORMS, EQUIPMENT CARRYING PLATFORMS (ETC.), WILL BE CONNECTED TO THE GROUNDING SYSTEM.
11. ALL CABLE TURNS WILL BE GREATER THAN 90°.
12. CONTINUOUS STEEL COMPONENTS WILL BE GROUNDED AT MAXIMUM 20-M INTERVALS.
13. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
14. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
15. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
16. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
17. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
18. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
19. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.(Düzenlendi)
20. GROUNDING BARS USED ON THE SURFACE. STAINLESS STEEL BOLTS WILL BE USED. FOR CU-STEEL CONNECTION INTERFACE, CU–ZN/AL BI-METALLIC PLATES SHALL BE USED.
21. BEFORE COMMISIONING CONTINUTY AND FALL-OF POTENTIAL TESTS SHALL BE CONDCUTED.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY → POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.11.205	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.205	FOR REVIEW	M.G.	C.U.	M.S.

SIZE	SCALE
A0	1/1

DRAWING NUMBER: ABA-ENG-ELC-DRW-2207
SHEET: 1
OF: 1
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS

CLIENT

EA Energy

CONTRACTOR

iLTEKNO

DESIGNER

n22®

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

0	06.02.26	FOR APPROVAL	M.G.	C.U	M.S
REV	**DATE**	**DESCRIPTION**	**DONE**	**CHECKED**	**APPROVED**

STATUS

FOR INFORMATION ☐
FOR REVIEW ☐
FOR APPROVAL ☒
VALID FOR DESIGN ☐
VALID FOR PURCHASE PROCESS ☐
VALID FOR CONSTRUCTION ☐
AS BUILT ☐

ISSUE OWNER

n22®

SIGN	DATE

DOCUMENT NUMBER

ABA-ENG-ELC-CAL-0003

DOCUMENT NAME

PRIMARY EQUIPMENT SIZING CALCULATIONS

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1. PURPOSE

This document specifies rating/size of main electrical equipment to be used in Abaco Power Plant, including MV Switchgear, LV Switchgear, MV/LV Auxiliary Transformer, LV/LV Auxiliary Transformer, UPS, DC & Battery System in purpose of ensuring a design quality, consistency and homogeneity based upon relevant codes and standards.

This document provides sizing calculations for electrical equipment to be used in gas engine power plant boundary.

2. DEFINITIONS AND ACRONYMS

EMPLOYER:	E.A ENERGY
CONTRACTOR:	İLTEKNO
DESIGNER:	N22
PROJECT:	ABACO HYBRID POWER PLANT

3. REFERENCES

3.1 Project Specifications

SPEC & Drawing	TITLE
ENGG24007	Technical Specification & Schedules of EPC Contract
ABA-ENG-MEC-SPE-0001	Mechanical Design Criteria
ABA-ENG-ELC-SPE-0001	Electrical Design Criteria
ABA-ENG-I&C-SPE-0001	Instrumentation And Control Design Criteria
ABA-ENG-MEC-RAS-0001	Fire Protection Risk Assessment Study
ABA-ENG-MEC-DRW-4010	Fire Protection System Lay Out
ABA-ENG-MEC-CAL-4000	Fire Water Demand Calculation
ILT-BHMS-00-55-SLD-00-04_R16	ABACO POWER PLANT SLD

3.2 International Codes & Standards

Standards of the following organizations shall be reference for sizing of the equipment.

IEC	International Electrotechnical Commission
IEEE	The Institute of Electrical and Electronics Engineers
ANSI	American National Standards Institute
CE	Conformité Européenne (European Conformity)
DIN	Deutsches Institut für Normung
EN	European Norm (Standard)
ISO	International Organization for Standardization

4. LANGUAGE AND UNITS

All data, specification, drawings and documents shall be written in English.
All units of measurements and dimensions shall be consistent with the SI metric system:

Parameter	Symbol	Unit
Voltage	V	Volt
Current	A	Amper
Active Power	W	Watt
Reactive Power	VAr	Volt Amper - reactive
Apparent Power	VA	Volt Amper
Power Factor	p.f.	*unitless*
Temperature	°C	Celsius

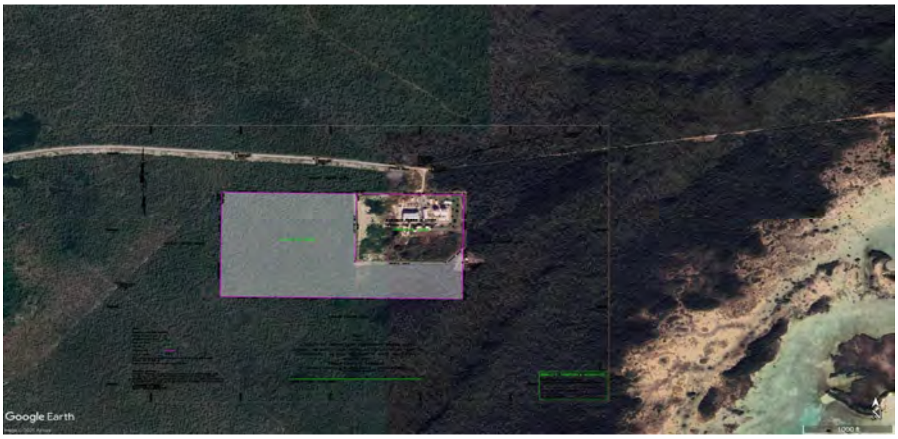
5. SITE CONDITION

The general project data and site condition are explicitly noted in the following documents.

The Site is located on the Island of Abaco immediately West of Wilson City Power Plant and approximately 4.8 miles Southeast of Great Abaco Highway. The total area of the Site is approximately 60 acres (24 ha).

The Site is located approximately at this location:

Latitude: 26.361859°
Longitude: -77.045710°



Location of the Site (Abaco Island)

5.1.1 Climatic Data

Flowing Climatic data will be used during design as ambient condition limitations for sizing and performance calculation of related equipment and their interconnecting systems,

Parameter	Unit	Average	Minimum	Maximum
Ambient air-dry bulb temperature	°C	26	16	34
Ambient air wet bulb temperature	°C	22.6	13	27
Relative Humidity	%	-	%71,6	%58,8
Ambient air pressure	mbar	1013	870	1080

5.1.2 Environmental Data

Based on the environmental conditions, design parameters are also provided hereunder this section.

Item No	Description	Particulars
1	Site Location	Abaco / Bahamas
2	Site Altitude	30 m
3	Average Wind Speed	12 kmph
4	Design Wind Speed	ASCE 7 -Category II 80,47 m/s
5	Maximum Rainfall Period	April
6	Daily Maximum Average Precipitation	280 mm
7	Design Precipitation	10 mm/h
8	Groundwater Depth	2 m
9	Service Lifetime of Plants	25 years

6. SIZING OF ELECTRICAL EQUIPMENT

6.1 MV SWITCHGEAR

The nominal operating voltage is 34.5 kV, as per IEC 60038 36 kV will be selected as Um.

The power ratings of generating loads connected to the MV are as follows:

Equipment	P (kW)	p.f.	S (kVA)	Q (kVAr)	I (A)
Generator 1	9975	0.800	12468.75	7481	209
Generator 2	9975	0.800	12468.75	7481	209
Generator 3	9975	0.800	12468.75	7481	209
SPP+BESS	23900	0.997	23965.45	1770	401
TOTAL	51640	0.947	54531.09	17520	912

- Generators' P and Q values are as per MAN's *Technical Specification Medium Voltage Synchronous Alternator* document.

- SPP+BESS rating is taken from Load Flow Analysis.

The connection will be to the MV switchgear of the existing Wilson City Power Plant. A new 34.5 kV 31.5 kV MV switchgear (WCPS 34.5 kV S/S) will be established (by others) at existing Wilson Power Plant.

The maximum current that the hybrid power plant can inject to grid is around 912 A. Busbar rating of the MV switchgear shall be 1250 A as per IEC 60059.

The short circuit rating of the MV switchgear shall be 31.5 kA, same as the new MV switchgear at Wilson Power Plant.

6.1.1 Outgoing Feeders (A01, A02)

Interconnection with Wilson Power Plant for energy evacuation shall be through 2 identical feeders, A01 and A02. One feeder shall be capable for all current to evacuate all the energy. Current rating of the circuit breaker shall be same as busbar rating, 1250 A.

Total Current ($\sum I_{nominal}$) = 912 A

CB Rated Current (I_{CB}) = 1250 A

$I_{CB} > \sum I_{nominal}$ meets requirement.

6.1.1.1 Circuit breaker

Voltage: 36 kV

Current: 1250 A

Short circuit withstanding current: 31.5 kA

Nominal short circuit current: 2.65 kA (referring to the short circuit study)

2.65 kA < 31,5 kA meets requirement.

Short duration power-frequency withstand voltage: 70 kV (IEC 60071-1 Table - 2)

BIL: 170 kV (IEC 60071-1 Table - 2)

Making current: 80 kA

As per IEC 62271-100 peak factor for 60 Hz is given as 2.6.

2.65 kA x 2.6 = 6.89 kA < 80 kA meets requirement.

6.1.1.2 Protection CT

There shall be 2 measurement class (Network Analyzer & Back Synch Relay) and 2 protection class (Protection Relay & Spare) CT secondary cores in the incomer cubicles.

For 1250/1A 10P10 15 VA protection CT, the calculation is as follows.

CT type:	IEC Class 10P
Transformation ratio:	1250 A / 1 A
Nominal accuracy limiting factor K_{nalf}:	10
CT nominal burden P_n:	15 VA
Internal resistance R_{ct} :	1.33
Relay Type:	Woodward LS5 or equivalent
Nominal Current:	1 A
Relay burden:	0.1 VA

The sizing of CT shall be checked for Isc = 2.65 kA, actual value.

To ensure correct operation of the connected relay in case of close-up faults, the CT must be able to transform the set I>> (high set) symmetrical short-circuit current of 20 times I_{pn} without saturation.

$K_{oalf} \geq$ I>> (high set), at least 20

where:

K_{oalf}: operating accuracy limiting factor
I>>: set or settable maximum trip current

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

$P_{wire} = (2 \times 0.02171 \times 7) / 4 = 0.076$ VA

Total Burden of the circuit is;

$P_{total} = P_{relay} + P_{wire} = 0.176$ VA

The CT behaviour acc. to IEC-P will be described by the operating accuracy limiting factor K_{oalf}. It depends on the nominal accuracy limiting factor K_{nalf}, the nominal burden P_n, the internal CT burden P_{ct} and the total effective connected burden P_{total}.

$$K_{oalf} = K_{nalf} \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

K_{nalf}:	nominal accuracy limiting factor	10
P_n:	nominal burden	15 VA
P_{ct}:	internal CT burden	1.33 VA
P_{total}:	total effective connected burden	0.176 VA

K_{oalf} = 10 x (15 + 1.33) / (0.176 + 1.33)
K_{oalf} = 108.43

I>> (high set) = 2.65 kA / 1250 A
I>> (high set) = 2.12 A

The protection CT is adequate.

6.1.1.3 Measurement CTs

For 1250 / 1 Cl 0.5 FS 5 15 VA measurement CTs, the calculation is as follows.

CT type:	IEC Class 0.5
Ratio:	1250 A / 1 A
Instrument security factor FS:	5
CT nominal burden P_n:	0-15 VA
Internal resistance R_{ct}:	1.33
Meter/Analyzer Burden:	0.1 VA (max value selected)

In order to protect the connected measuring instrument in case of fault currents, the instrument security factor (FS) of the metering CT should be as small as possible. For this reason, the operating burden of the connected measuring instrument including the necessary connected cables should be as close as possible to the nominal burden of the measuring transformer.

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

$$I_{\max} \geq I_{sn} \cdot FS'$$

Where;

FS':	Operating instrument security factor
FS:	Instrument security factor
P_n:	CT nominal burden
P_{ct}:	CT internal burden
P_{total}:	Total effective connected burden
I_{max}:	Rated short-time thermal current
I_{sn}:	Nominal secondary current of CT

Moreover, in order to assure the measuring accuracy, the total connected burden has to be less than nominal burden.

$P_{total} \leq P_n$

As per IEC 61869-3 for metering cores having a rated burden between 1 VA and 15 VA an extended range of burden can be specified in agreement with the manufacturer. In certain cases, this range might be extended individually.

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 $\Omega\ mm^2/m$ at 75 °C
Eff. wire length in p.u. k_{wire}:	2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{meter} + P_{wire}$ = 0.176 VA

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

FS:Instrument security factor = 5
P_n: Nominal burden = 15 VA
P_{ct}: Internal CT burden = 7 VA
P_{total}: Total effective connected burden = 0.176 VA

FS’ = 15.33

For meter/analyzer I_{max} = 100 A has been taken.

$$I_{\max} \geq I_{sn} \cdot FS'$$

100 ≥ 1 x 15.33 meets requirement

$P_{total} \leq P_n$ requirement

0.176 ≤ 15 meets requirement

6.1.1.4 Voltage transformer

There will be 2 VTs inside the cubicles:

Core 1 : Us=0.11/V3 kV; 30 VA; class 0.5
Core 2 : Us=0.11/3 kV; 30 VA; class 3P

For sizing of the VTs the following requirements have been checked:

1. The burden shall be between 0% and 100% of the rated burden.
2. The voltage drop along the secondary wiring shall not be higher that 0.5%.

As per IEC 61869-3 for windings having a rated burden lower than 10VA an extended range of burden can be specified in agreement with the manufacturer.

Cable burden

Length:	7 m
Cross section:	2.5 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

R_{wire} = (2 x 0.02171 x 7) / 2.5 = 0.1216 Ω

The total effective burden is given by the sum of all connected burdens:

REX615	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Analyzer	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Voltmeter	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Lamp	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Total	2.1 VA per phase	@1.1/V3 kV	1.92 kΩ

Incl. R wire in series.

2.1 VA < 30 VA Requirement 1 is OK

Voltage drop
R_{wire} / R_{total} = 0.1216 / 1920 = 0.0063% < 0.5% Requirement 2 is OK

6.1.2 Metering (A03)

For measurement of voltage and current of MV busbar, metering cubicle shall have the following instrument transformers;

2 measurement CTs 1250 / 1 Cl 0.5 FS 5 15 VA

VT 1 0.11/V3 kV; 30 VA; class 0.5

VT 2 0.11/V3 kV; 30 VA; class 3P

VT 3 0.11/3 kV; 20 VA; class 3P

6.1.2.1 Measurement CTs

For 1250 / 1 Cl 0.5 FS 5 15 VA measurement CTs, the calculation is as follows.

CT type: IEC Class 0.5
Ratio: 1250 A / 1 A
Instrument security factor FS: 5
CT nominal burden P_n: 0-5 VA
Internal resistance R_{ct}: 7
Analyzer Burden: 0.1 VA (max value selected)

In order to protect the connected measuring instrument in case of fault currents, the instrument security factor (FS) of the metering CT should be as small as possible. For this reason, the operating burden of the connected measuring instrument including the necessary connected cables should be as close as possible to the nominal burden of the measuring transformer.

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

$$I_{\max} \geq I_{sn} \cdot FS'$$

Where;

FS': Operating instrument security factor
FS: Instrument security factor
P_n: CT nominal burden
P_{ct}: CT internal burden
P_{total}: Total effective connected burden
I_{max}: Rated short-time thermal current
I_{sn}: Nominal secondary current of CT

Moreover, in order to assure the measuring accuracy, the total connected burden has to be less than nominal burden.

$P_{total} \leq P_n$

As per IEC 61869-3 for metering cores having a rated burden between 1 VA and 15 VA an extended range of burden can be specified in agreement with the manufacturer. In certain cases, this range might be extended individually.

Cable burden

Length: 7 m
Cross section: 4 mm^2
Resistivity: 0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}: 2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{meter} + P_{wire}$ = 0.176 VA

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

FS:Instrument security factor = 5
P_n: Nominal burden = 15 VA
P_{ct}: Internal CT burden = 7 VA
P_{total}: Total effective connected burden = 0.176 VA

FS' = 15.33

For analyzer I_{max} = 100 A has been taken.

$$I_{max} \geq I_{sn} \cdot FS'$$

100 ≥ 1 x 15.33 meets requirement

$P_{total} \leq P_n$ requirement

0.176 ≤ 15 meets requirement

6.1.2.2 Voltage transformer

There will be 3 VTs inside the cubicles:

VT 1	0.11/V3 kV; 30 VA; class 0.5
VT 2	0.11/V3 kV; 30 VA; class 3P
VT 3	0.11/3 kV; 20 VA; class 3P

For sizing of the VTs the following requirements have been checked:

1. The burden shall be between 0% and 100% of the rated burden.
2. The voltage drop along the secondary wiring shall not be higher that 0.5%.

For measurement VT, cable burden

Length: 7 m
Cross section: 2.5 mm^2
Resistivity: 0.02171 $\Omega\ mm^2/m$ at 75 °C
Eff. wire length in p.u. k_{wire}: 2

R_{wire} = (2 x 0.02171 x 7) / 2.5 = 0.1216 Ω

The total effective burden is given by the sum of all connected burdens:

Analyzer	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Total	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ

Incl. R wire in series.

0.05 VA < 30 VA Requirement 1 is OK

Voltage drop
R_{wire} / R_{total} = 0.1216 / 80670 = 0.00015% < 0.5% Requirement 2 is OK

For protection VT (GENSETS), cable burden

Length: 50 m
Cross section: 2.5 mm^2
Resistivity: 0.02171 $\Omega\ mm^2/m$ at 75 °C
Eff. wire length in p.u. k_{wire}: 2

R_{wire} = (2 x 0.02171 x 50) / 2.5 = 0.8684 Ω

The total effective burden is given by the sum of all connected burdens:

GCP 1	2 VA per phase	@1.1/V3 kV	6.05 kΩ
GCP 2	2 VA per phase	@1.1/V3 kV	6.05 kΩ
GCP 3	2 VA per phase	@1.1/V3 kV	6.05 kΩ
Total	6 VA per phase	@1.1/V3 kV	2.017 kΩ

Incl. R wire in series.

6 VA < 30 VA Requirement 1 is OK

Voltage drop
$R_{wire} / R_{total} = 0.8684 / 2017 = 0.00043\% < 0.5\%$ Requirement 2 is OK

6.1.3 Auxiliary Transformer Outgoing (A04)

Internal consumption of the power plant, 34.5 / 0.48 2000 kVA transformer shall be installed.

I_n = 2000 / 34.5 / V3 = 33.5 A

The feeder shall have 1250 A CB.

6.1.3.1 Circuit breaker

Voltage: 36 kV

Current: 1250 A

Short circuit current: 31.5 kA

Nominal short circuit current: 8.67 kA (referring to the short circuit study)

7,67 kA < 31,5 kA meets requirement.

Short duration power-frequency

withstand voltage: 70 kV (IEC 60071-1 Table - 2)

BIL: 170 kV (IEC 60071-1 Table - 2)

Making current: 80 kA

As per IEC 62271-100 peak factor for 60 Hz is given as 2.6.

8.67 kA x 2.6 = 22.54 kA < 80 kA meets requirement.

6.1.3.2 Protection CT

There shall be 1 measurement class (analyzer) and 1 protection class (protection relay) CT in the incomer cubicles.

For 100 / 1 5P20 10 VA protection CT, the calculation is as follows.

CT type:	IEC Class 10P
Transformation ratio:	100 A / 1 A
Nominal accuracy limiting factor K_{nalf}:	20
CT nominal burden P_n:	10 VA
Internal resistance R_{ct} :	1.33
Relay Type:	ABB REX615
Nominal Current:	1 A
Relay burden:	0.1 VA

To ensure correct operation of the connected relay in case of close-up faults, the CT must be able to transform the set I>> (high set) symmetrical short-circuit current of 20 times I_{pn} without saturation.

$K_{oalf} \geq$ I>> (high set), at least 20

where:

K_{oalf}: operating accuracy limiting factor
I>>: set or settable maximum trip current

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

$P_{wire} = (2 \times 0.02171 \times 7) / 4 = 0.076$ VA

Total Burden of the circuit is;

$P_{total} = P_{relay} + P_{wire} = 0.176$ VA

The CT behaviour acc. to IEC-P will be described by the operating accuracy limiting factor K_{oalf}. It depends on the nominal accuracy limiting factor K_{nalf}, the nominal burden P_n, the internal CT burden P_{ct} and the total effective connected burden P_{total}.

$$K_{oalf} = K_{nalf}\frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

K_{nalf}:	nominal accuracy limiting factor	20
P_n:	nominal burden	10 VA
P_{ct}:	internal CT burden	1.33 VA
P_{total}:	total effective connected burden	0.176 VA

K_{oalf} = 20 x (10 + 1.33) / (0.176 + 1.33)
K_{oalf} = 150.46

I>> (high set) = 35 A
K_{oalf} ≥ I>> (high set) meets the requirement

6.1.3.3 Measurement CTs

For 1250 / 1 Cl 0.5 FS 5 15 VA measurement CTs, the calculation is as follows.

CT type: IEC Class 0.5
Ratio: 100 A / 1 A
Instrument security factor FS: 5
CT nominal burden P_n: 0-5 VA
Internal resistance R_{ct}: 7
Meter/Analyzer Burden: 0.1 VA (max value selected)

In order to protect the connected measuring instrument in case of fault currents, the instrument security factor (FS) of the metering CT should be as small as possible. For this reason, the operating burden of the connected measuring instrument including the necessary connected cables should be as close as possible to the nominal burden of the measuring transformer.

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

$$I_{\max} \geq I_{sn} \cdot FS'$$

Where;

FS': Operating instrument security factor
FS: Instrument security factor
P_n: CT nominal burden
P_{ct}: CT internal burden
P_{total}: Total effective connected burden
I_{max}: Rated short-time thermal current
I_{sn}: Nominal secondary current of CT

Moreover, in order to assure the measuring accuracy, the total connected burden has to be less than nominal burden.

$P_{total} \leq P_n$

As per IEC 61869-3 for metering cores having a rated burden between 1 VA and 15 VA an extended range of burden can be specified in agreement with the manufacturer. In certain cases, this range might be extended individually.

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{meter} + P_{wire}$ = 0.176 VA

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

FS:Instrument security factor = 5
P_n: Nominal burden = 10 VA
P_{ct}: Internal CT burden = 7 VA
P_{total}: Total effective connected burden = 0.176 VA

FS’ = 11.85

For meter/analyzer I_{max} = 100 A has been taken.

$$I_{\max} \geq I_{sn} \cdot FS'$$

100 ≥ 1 x 11.85 meets requirement

$P_{total} \leq P_n$ requirement

0.176 ≤ 15 meets requirement

6.1.4 GSUT feeders (A04, A05, A06)

GENSETs shall be connected to the MV switchgear through 14 MVA GSUTs.

I_n = 14000 / 34.5 / V3 = 234.29 A

The feeder shall have 1250 A CB.

4 CTs shall be installed inside the cubicles.

CT 1 300 / 1 A; 15 VA; class 0.2; FS 5

CT 2 300 / 1 A; 15 VA; class 0,5; FS 5

CT 3 300 / 1 A; 15 VA; class 5P20

CT 4 300 / 1 A; 15 VA; class 5P20

3 VTs shall be installed inside cubicles.

VT 1 0.11/V3 kV; 30 VA; class 0.2

VT 2 0.11/V3 kV; 30 VA; class 0.5

VT 3 0.11/3 kV; 30 VA; class 3P

6.1.4.1 Circuit breaker

Voltage:	36 kV
Current:	1250 A
Short circuit current:	31.5 kA
Nominal short circuit current:	7.76 kA (referring to the short circuit study)

7.76 kA < 31,5 kA meets requirement.

Short duration power-frequency withstand voltage:	70 kV (IEC 60071-1 Table - 2)
BIL:	170 kV (IEC 60071-1 Table - 2)
Making current:	80 kA

As per IEC 62271-100 peak factor for 60 Hz is given as 2.6.

7.76 kA x 2.6 = 20.18 kA < 80 kA meets requirement.

6.1.4.2 Protection CT

There shall be 2 measurement class (tariff meter and analyzer) and 1 protection class (protection relay) CT in the incomer cubicles.

For 300 / 1 5P20 15 VA protection CT, the calculation is as follows.

CT type:	IEC Class 5P
Transformation ratio:	300 A / 1 A
Nominal accuracy limiting factor K_{nalf}:	20
CT nominal burden P_n:	15 VA
Internal resistance R_{ct} :	1.33
Relay Type:	SEG MCDGV
Nominal Current:	1 A
Relay burden:	0.1 VA

The sizing of CT shall be checked for Isc = 6.88 kA, actual value.

To ensure correct operation of the connected relay in case of close-up faults, the CT must be able to transform the set I>> (high set) symmetrical short-circuit current of 20 times I_{pn} without saturation.

$K_{oalf} \geq$ I>> (high set), at least 20

where:

K_{oalf}: operating accuracy limiting factor
I>>: set or settable maximum trip current

Cable burden

Length:	50 m (for GCP, max case)
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

$P_{wire} = (2 \times 0.02171 \times 50) / 4 = 0.543$ VA

Total Burden of the circuit is;

$P_{total} = P_{relay} + P_{wire} = 0.643$ VA

The CT behaviour acc. to IEC-P will be described by the operating accuracy limiting factor K_{oalf}. It depends on the nominal accuracy limiting factor K_{nalf}, the nominal burden P_n, the internal CT burden P_{ct} and the total effective connected burden P_{total}.

$$K_{oalf} = K_{nalf} \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

K_{nalf}:	nominal accuracy limiting factor	20
P_n:	nominal burden	15 VA
P_{ct}:	internal CT burden	1.33 VA
P_{total}:	total effective connected burden	0.643 VA

K_{oalf} = 20 x (15 + 1.33) / (0.676 + 1.33)
K_{oalf} = 162.81

I>> (high set) = 7.76 kA / 300 A
I>> (high set) = 25.87

The protection CT is adequate.

6.1.4.3 Measurement CTs

For 300 / 1 Cl 0.2 FS 5 30 VA measurement CTs, the calculation is as follows.

CT type: IEC Class 0.5
Ratio: 300 A / 1 A
Instrument security factor FS: 5
CT nominal burden P_n: 0-5 VA
Internal resistance R_{ct}: 1.33
Meter/Analyzer Burden: 0.1 VA (max value selected)

In order to protect the connected measuring instrument in case of fault currents, the instrument security factor (FS) of the metering CT should be as small as possible. For this reason, the operating burden of the connected measuring instrument including the necessary connected cables should be as close as possible to the nominal burden of the measuring transformer.

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

$$I_{\max} \geq I_{sn} \cdot FS'$$

Where;

FS': Operating instrument security factor
FS: Instrument security factor
P_n: CT nominal burden
P_{ct}: CT internal burden
P_{total}: Total effective connected burden
I_{max}: Rated short-time thermal current
I_{sn}: Nominal secondary current of CT

Moreover, in order to assure the measuring accuracy, the total connected burden has to be less than nominal burden.

$P_{total} \leq P_n$

As per IEC 61869-3 for metering cores having a rated burden between 1 VA and 15 VA an extended range of burden can be specified in agreement with the manufacturer. In certain cases, this range might be extended individually.

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{meter} + P_{wire}$ = 0.176 VA

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

FS:Instrument security factor = 5
P_n: Nominal burden = 30 VA
P_{ct}: Internal CT burden = 7 VA
P_{total}: Total effective connected burden = 0.176 VA

FS’ = 104.02

For meter I_{max} = 100 A has been taken.

$$I_{\max} \geq I_{sn} \cdot FS'$$

100 ≥ 25.78 meets requirement

$P_{total} \leq P_n$ requirement

0.176 ≤ 15 meets requirement

6.1.4.4 Voltage transformer

There will be 3 VTs inside the cubicles:

Core 1 : Us=0.11/V3 kV; 30 VA; class 0.2
Core 2 : Us=0.11/V3 kV; 30 VA; class 0.5
Core 3 : Us=0.11/3 kV; 30 VA; class 3P

For sizing of the VTs the following requirements have been checked:

1. The burden shall be between 0% and 100% of the rated burden.
2. The voltage drop along the secondary wiring shall not be higher that 0.5%.

Cable burden

Length:	7 m
Cross section:	2.5 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

R_{wire} = (2 x 0.02171 x 7) / 2.5 = 0.1216 Ω

The total effective burden is given by the sum of all connected burdens:

SEG	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Analyzer	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Voltmeter	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Lamp	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Total	2.1 VA per phase	@1.1/V3 kV	1.92 kΩ

Incl. R wire in series.

2.1 VA < 30 VA Requirement 1 is OK

Voltage drop
R_{wire} / R_{total} = 0.1216 / 1920 = 0.0063% < 0.5% Requirement 2 is OK

6.1.5 SPP feeder (A07) SHOULD THIS BE A08?

Interconnection with SPP + BESS plant shall be through A08 feeder. Maximum current is 471 A.

6.1.5.1 Circuit breaker

Voltage: 36 kV

Current: 1250 A

Short circuit current: 31.5 kA

Nominal short circuit current: 8.02 kA (referring to the short circuit study)

8.02 kA < 31,5 kA meets requirement.

Short duration power-frequency

withstand voltage: 70 kV (IEC 60071-1 Table - 2)

BIL: 170 kV (IEC 60071-1 Table - 2)

Making current: 80 kA

As per IEC 62271-100 peak factor for 60 Hz is given as 2.6.

8.02 kA x 2.6 = 20.852 kA < 80 kA meets requirement.

6.1.5.2 Protection CT

There shall be 1 protection class (protection relay) CT in the cubicle.

For 600 / 1 10P10 15 VA protection CT, the calculation is as follows.

CT type:	IEC Class 10P
Transformation ratio:	1250 A / 1 A
Nominal accuracy limiting factor K_{nalf}:	10
CT nominal burden P_n:	15 VA
Internal resistance R_{ct} :	1.33
Relay Type:	ABB
Nominal Current:	1 A
Relay burden:	0.1 VA

The sizing of CT shall be checked for Isc = 8.02 kA, actual value.

To ensure correct operation of the connected relay in case of close-up faults, the CT must be able to transform the set I>> (high set) symmetrical short-circuit current of 20 times I_{pn} without saturation.

$K_{oalf} \geq$ I>> (high set), at least 20

where:

K_{oalf}: operating accuracy limiting factor
I>>: set or settable maximum trip current

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{relay} + P_{wire}$ = 0.176 VA

The CT behaviour acc. to IEC-P will be described by the operating accuracy limiting factor K_{oalf}. It depends on the nominal accuracy limiting factor K_{nalf}, the nominal burden P_n, the internal CT burden P_{ct} and the total effective connected burden P_{total}.

$$K_{oalf} = K_{nalf} \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

K_{nalf}:	nominal accuracy limiting factor	10
P_n:	nominal burden	15 VA
P_{ct}:	internal CT burden	1.33 VA
P_{total}:	total effective connected burden	0.176 VA

K_{oalf} = 10 x (15 + 1.33) / (0.176 + 1.33)
K_{oalf} = 108.43

I>> (high set) = 8.02 kA / 600 A
I>> (high set) = 13.37

The protection CT is adequate.

6.1.5.3 Measurement CTs

For 600 / 1 Cl 0.2 FS 5 30 VA measurement CTs, the calculation is as follows.

CT type: IEC Class 0.5
Ratio: 1250 A / 1 A
Instrument security factor FS: 5
CT nominal burden P_n: 0-5 VA
Internal resistance R_{ct}: 1.33
Meter/Analyzer Burden: 0.1 VA (max value selected)

In order to protect the connected measuring instrument in case of fault currents, the instrument security factor (FS) of the metering CT should be as small as possible. For this reason, the operating burden of the connected measuring instrument including the necessary connected cables should be as close as possible to the nominal burden of the measuring transformer.

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

$$I_{\max} \geq I_{sn} \cdot FS'$$

Where;

FS': Operating instrument security factor
FS: Instrument security factor
P_n: CT nominal burden
P_{ct}: CT internal burden
P_{total}: Total effective connected burden
I_{max}: Rated short-time thermal current
I_{sn}: Nominal secondary current of CT

Moreover, in order to assure the measuring accuracy, the total connected burden has to be less than nominal burden.

$P_{total} \leq P_n$

As per IEC 61869-3 for metering cores having a rated burden between 1 VA and 15 VA an extended range of burden can be specified in agreement with the manufacturer. In certain cases, this range might be extended individually.

Cable burden

Length:	7 m
Cross section:	4 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

P_{wire} = (2 x 0.02171 x 7) / 4 = 0.076 VA

Total Burden of the circuit is;

$P_{total} = P_{meter} + P_{wire}$ = 0.176 VA

$$FS' = FS \cdot \frac{P_n + P_{ct}}{P_{total} + P_{ct}}$$

Where;

FS:Instrument security factor = 5
P_n: Nominal burden = 30 VA
P_{ct}: Internal CT burden = 7 VA
P_{total}: Total effective connected burden = 0.176 VA

FS’ = 25.78

For meter I_{max} = 100 A has been taken.

$$I_{max} \geq I_{sn} \cdot FS'$$

100 ≥ 1 x 25.78 meets requirement

$P_{total} \leq P_n$ requirement

0.176 ≤ 15 meets requirement

6.1.5.4 Voltage transformer

There will be 3 VTs inside the cubicles:

Core 1 : Us=0.11/V3 kV; 30 VA; class 0.2
Core 2 : Us=0.11/V3 kV; 30 VA; class 0.5
Core 3 : Us=0.11/3 kV; 30 VA; class 3P

For sizing of the VTs the following requirements have been checked:

1. The burden shall be between 0% and 100% of the rated burden.
2. The voltage drop along the secondary wiring shall not be higher that 0.5%.

As per IEC 61869-3 for windings having a rated burden lower than 10VA an extended range of burden can be specified in agreement with the manufacturer.

Cable burden

Length:	7 m
Cross section:	2.5 mm^2
Resistivity:	0.02171 Ω mm^2/m at 75 °C
Eff. wire length in p.u. k_{wire}:	2

R_{wire} = (2 x 0.02171 x 7) / 2.5 = 0.1216 Ω

The total effective burden is given by the sum of all connected burdens:

Relay	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Analyzer	0.05 VA per phase	@1.1/V3 kV	80.67 kΩ
Voltmeter	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Lamp	1 VA per phase	@1.1/V3 kV	4.04 kΩ
Total	2.1 VA per phase	@1.1/V3 kV	1.92 kΩ
Incl. R wire in series.			

2.1 VA < 30 VA Requirement 1 is OK

Voltage drop
R_{wire} / R_{total} = 0.1216 / 1920 = 0.0063% < 0.5% Requirement 2 is OK

6.2 MV/LV AUXILIARY TRANSFORMER

The MV/LV auxiliary transformer will feed all internal LV loads, inside gas plant. The total load is estimated as 2000 kVA as per Electrical Load List.

As per IEC 60076-5 Table - 1 uk% will be 6%.

Voltage ratings of the windings will be 34.5 kV and 0.48 kV. The tap changer will be on HV side with 5 steps ± 2x2.5%, +/- 5% voltage regulation.

Preliminary load list, to be fed from aux transformer is as follows:

FEEDER NAME	Feeder	Active Power (kW)	p.f.	Apperant Power (kVA)	Reactive Power (kVAr)
FIRE FIGHTING PUMP	1	22,50	0,70	32,14	22,95
INCOMER	2	1491,01	0,86	1740,32	897,55
BSDG	3	-400,00	0,80	500,00	-300,00
LV/LV TRANSFORMER 208	4	320,00	0,80	400,00	240,00
LV/LV TRANSFORMER 400	5	80,00	0,80	100,00	60,00
EAP - 1 Engine Auxiliary Panel	6	64,65	0,81	79,93	47,00
EAP - 2 Engine Auxiliary Panel	7	90,02	0,92	97,85	38,35
EAP - 3 Engine Auxiliary Panel	8	90,02	0,92	97,85	38,35
ERP - 1 Engine Radiator Panel	9	149,94	0,90	166,60	72,62
ERP - 2 Engine Radiator Panel	10	149,94	0,90	166,60	72,62
ERP - 3 Engine Radiator Panel	11	149,94	0,90	166,60	72,62
LNG RE-GASIFICATION FACILITY	12	100,00	0,80	125,00	75,00
CAP Common Auxiliary Panel	13	76,50	0,83	91,68	50,53
WSDP Workhop Distribution Panel	14	40,00	0,80	50,00	30,00
DC - 125V	15	40,00	0,90	44,44	19,37
UPS - 400V	16	40,00	0,90	44,44	19,37
WTDP Water Treatment Distribution Panel	17	10,00	0,80	12,50	7,50
PLANT HVAC PANEL	18	50,00	0,90	55,56	24,22
FIRE FIGHTING PUMP	1	22,50	0,70	32,14	22,95

For 1740 kVA total load, 2000 kVA transformer rating is adequate.

6.3 LV SWITCHGEAR

The LV switchgear will provide power the process and non-process loads inside gas plant without any restrictions. The incomer CB and busbar will be rated as per full load secondary current of auxiliary transformer. With 10% voltage tolerance;

$$I = 2000 \text{ kVA} / 0.48 \text{ kV} / 1.73 / 0.9 = 2408 \text{ A}$$

Current:	2500 A
Short circuit current:	50 kA
Nominal short circuit current:	36.73 kA (referring to the short circuit study)

36.73 kA < 50 kA meets requirement.

6.4 LV/LV AUXILIARY TRANSFORMERS

The 0.48/0.208 LV/LV auxiliary transformer will feed all internal 208/120 V loads, inside gas plant. Those loads are some process and lighting/small power loads as follows;

FEEDER NAME	Feeder	Active Power (kW)	p.f.	Apperant Power (kVA)	Reactive Power (kVAr)
ADMIN BUILDING PANEL	2	50,00	0,90	55,56	24,22
ACCOMODATION BULDING PANEL	3	50,00	0,90	55,56	24,22
MACHINE HALL LIGHTING & SMALL POWER	4	3,60	0,90	4,00	1,74
OUTDOOR LIGHTING PANEL	5	10,00	0,90	11,11	4,84
CONTROL ROOM LIGHTING & SMALL POWER	6	6,00	0,90	6,67	2,91
GHDP Gate House Distribution Panel	7	13,11	0,85	15,48	8,24
UPS - 208V	8	35,00	0,95	36,84	11,50

For lighting and small power, the values are calculated with load factor (utilization). To avoid any overload possibility; total 168 kW, with 50% tolerance and 80% p.f., total requirement is 315 kVA. To be on safe side next preferred rating as per IEC 60076-1 has been selected, as 400 kVA.

As per IEC 60076-5 Table – 1 uk% will be 4%. In detail design stage, it will be confirmed/updated.

Another 400/230 LV/LV 100 kVA transformer will be utilized for 230 V process/control loads.

FEEDER NAME	NO	Active Power (kW)	p.f.	Apparent Power (kVA)	Reactive Power (kVAr)
GCP - 1 Genset Control Panel	2	2,00	0,95	2,11	0,66
GCP - 2 Genset Control Panel	3	2,00	0,95	2,11	0,66
GCP - 3 Genset Control Panel	4	2,00	0,95	2,11	0,66
EAP - 1 Engine Auxiliary Panel	5	0,55	0,86	0,64	0,32
EAP - 2 Engine Auxiliary Panel	6	0,55	0,86	0,64	0,32
EAP - 3 Engine Auxiliary Panel	7	0,55	0,86	0,64	0,32
SACOS - 1	8	3,00	0,95	3,16	0,99
SACOS - 2	9	3,00	0,95	3,16	0,99
SACOS - 3	10	3,00	0,95	3,16	0,99
CCP	11	2,00	0,95	2,11	0,66

Total power requirement is 20 kW. With 100% tolerance and 80% p.f. total power requirement is 50 kVA. As per IEC 60076-1, 100 kVA rating is adequate.

6.5 208 V LV SWITCHGEAR

208/120 V loads will be fed from 2nd LV switchgear. For 10% voltage drop;

I = 400 kVA / 0.208 kV / 1.73 / 0.9 = 1235 A

Current:	1250 A
Short circuit current:	20 kA
Nominal short circuit current:	9.20 kA (referring to the short circuit study)

9.20 kA < 20 kA meets requirement.

6.6 400 V LV SWITCHGEAR

400/230 V loads will be fed from 400 V LV switchgear. For 10% voltage drop;

I = 100 kVA / 0.4 kV / 1.73 / 0.9 = 161 A

Current: 250 A

Short circuit current: 16 kA

Nominal short circuit current: 3.69 kA (referring to the short circuit study)

3,69 kA < 16 kA meets requirement.

.

6.7 GENSET NEUTRAL EARTHING RESISTOR

For zero sequence current protection (LG fault) of the alternator, a resistor will be connected between alternators' NEUTRAL terminal and earthing bus.

Xd% of alternator is taken as 20% as a generic value. As per MAN alternator datasheet;

Vnominal = 13800 V
Inominal = 522 A

For 3 phase systems Zbase = Vbase / Ibase / 1.73

Z = Xd% x Zbase = 20/100 x (13800 / 522 / 1.73)
Z = 3.056 Ohms

The current limit for ground faults is selected as 25 A as per MAN documentation.

Ztotal = 13800 / 1.73 / 25
= 319 Ohms

Since 319 >> 3 Ohms, NER resistance value can be selected as 319 Ohms.

Maximum time duration of neutral current is selected as 10 seconds, which is under unbalanced operation time limit, 20 seconds, of the alternator.

Detailed thermal energy (I^2t) calculations and thermal verification have been submitted as part of the NER design. The calculation summary is provided below.

13.8/$\sqrt{3}$ kV 25 A 10 s / 1 A cont 319 Ohm NER;

Total Short Time Heat Dissipation is:
$P = I^2 \times R$
$= (25)^2 \times 319$
= 199 kW

$E = P \times t$
$= 199\ \mathrm{kW} \times 10\ \mathrm{sec}$
$= 1.99\ \mathrm{MJ}$

Continuous Heat Dissipation is:
$P = I^2\mathrm{cont} \times R$
$= 1 \times 1 \times 319$
$= 319\ \mathrm{W}$

$E = P \times t$
$= 319\ \mathrm{W} \times 10\ \mathrm{s}$
$\approx 3.19\ \mathrm{kJ}$

6.8 GSUT NEUTRAL EARTHING RESISTOR

For zero sequence current protection (LG fault) of the GSUT, a resistor will be connected between GSUT's NEUTRAL terminal and earthing bus.

The current limit for ground faults is selected as 1000 A.

$\text{Ztotal} = 34500 / 1.73 / 1000$
$= 19.9 \text{ Ohms}$

Maximum time duration of neutral current shall be 10 seconds.

Detailed thermal energy (I^2t) calculations and thermal verification have been submitted as part of the NER design. The calculation summary is provided below.

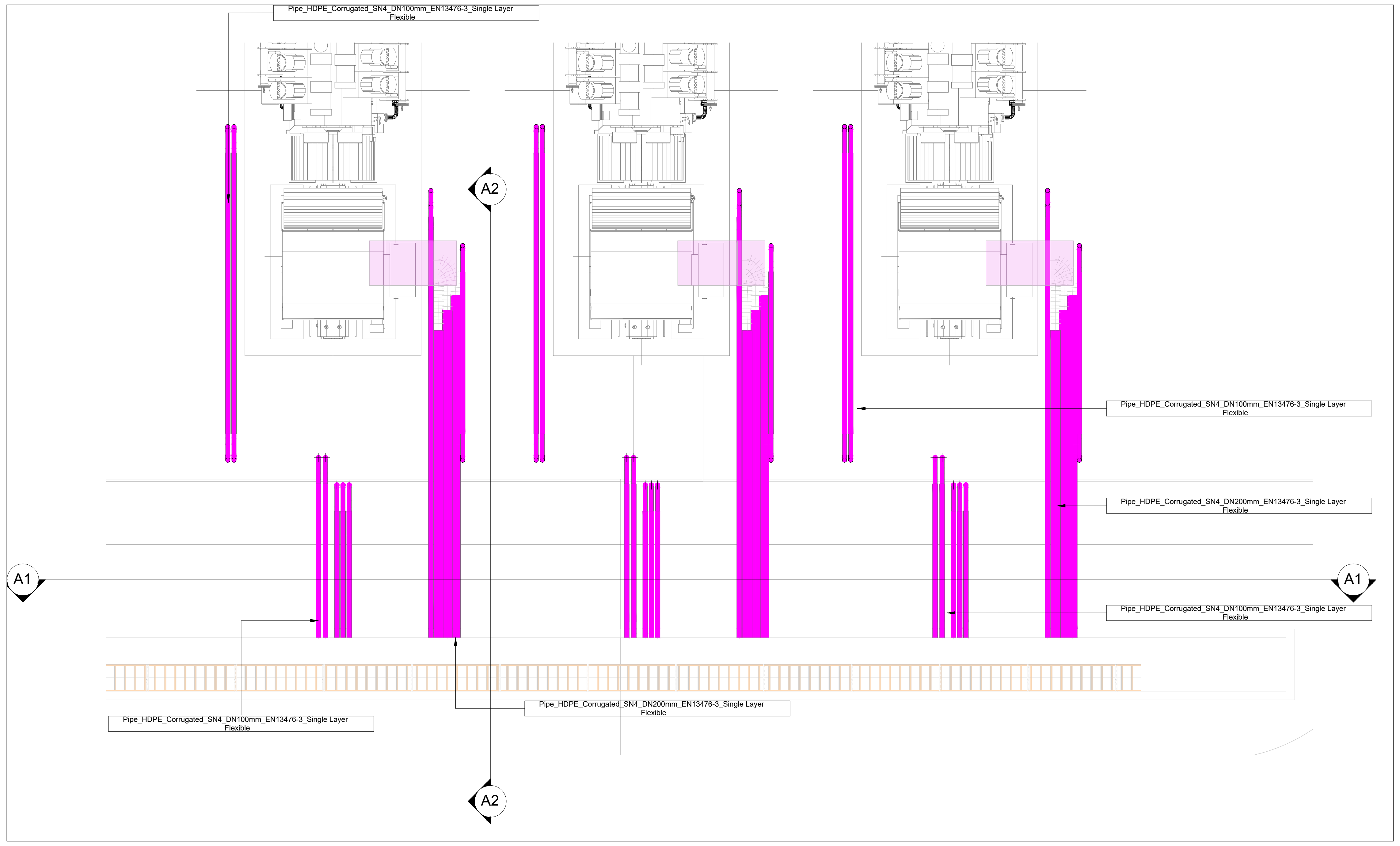
34,5/$\sqrt{3}$ kV 1000 A 10 s / 40 A cont 19,9 Ohm NER;

Total Short Time Heat Dissipation is:
$P= I^2 \times R$
$= (1000)^2 \times 19.9$
$=19.9 \text{ MW}$

$E = P \times t$
$= 19{,}9 \text{ MW} \times 10 \text{ sec}$
$\approx 199 \text{ MJ}$

Continuous Heat Dissipation is:
$P = I^2\text{cont x } R$
$= 40 \text{ x } 40 \text{ x } 19.9$
$= 31.84 \text{ kW}$

$E = P \times t$
$= 31.84 \text{ kW} \times 10 \text{ sec.}$
$\approx 318.4 \text{ kJ}$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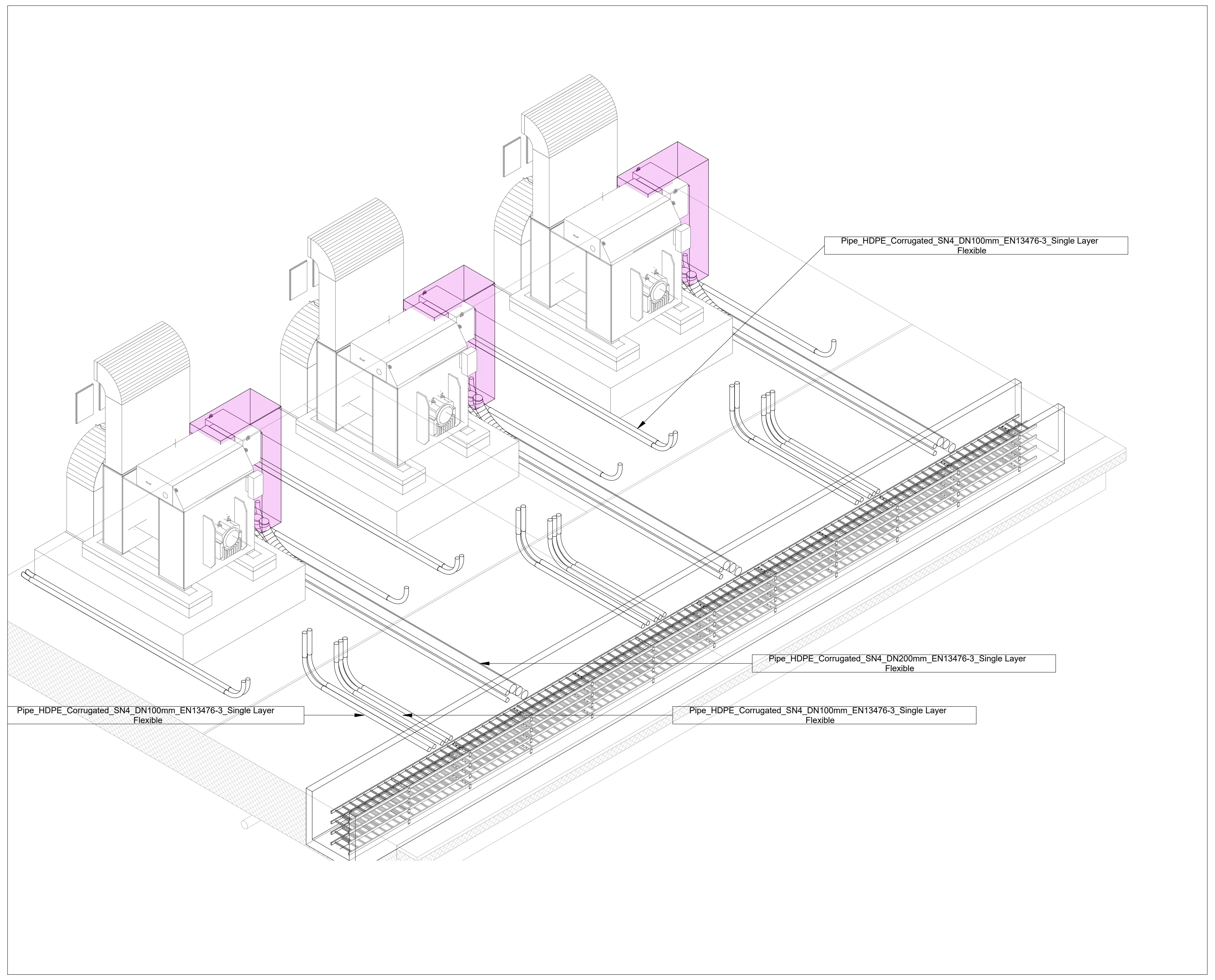
A2
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible
Pipe_HDPE_Corrugated_SN4_DN200mm_EN13476-3_Single Layer Flexible
A1
A1
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible
Pipe_HDPE_Corrugated_SN4_DN200mm_EN13476-3_Single Layer Flexible
A2

AREA ENS PLAN
SCALE:1/40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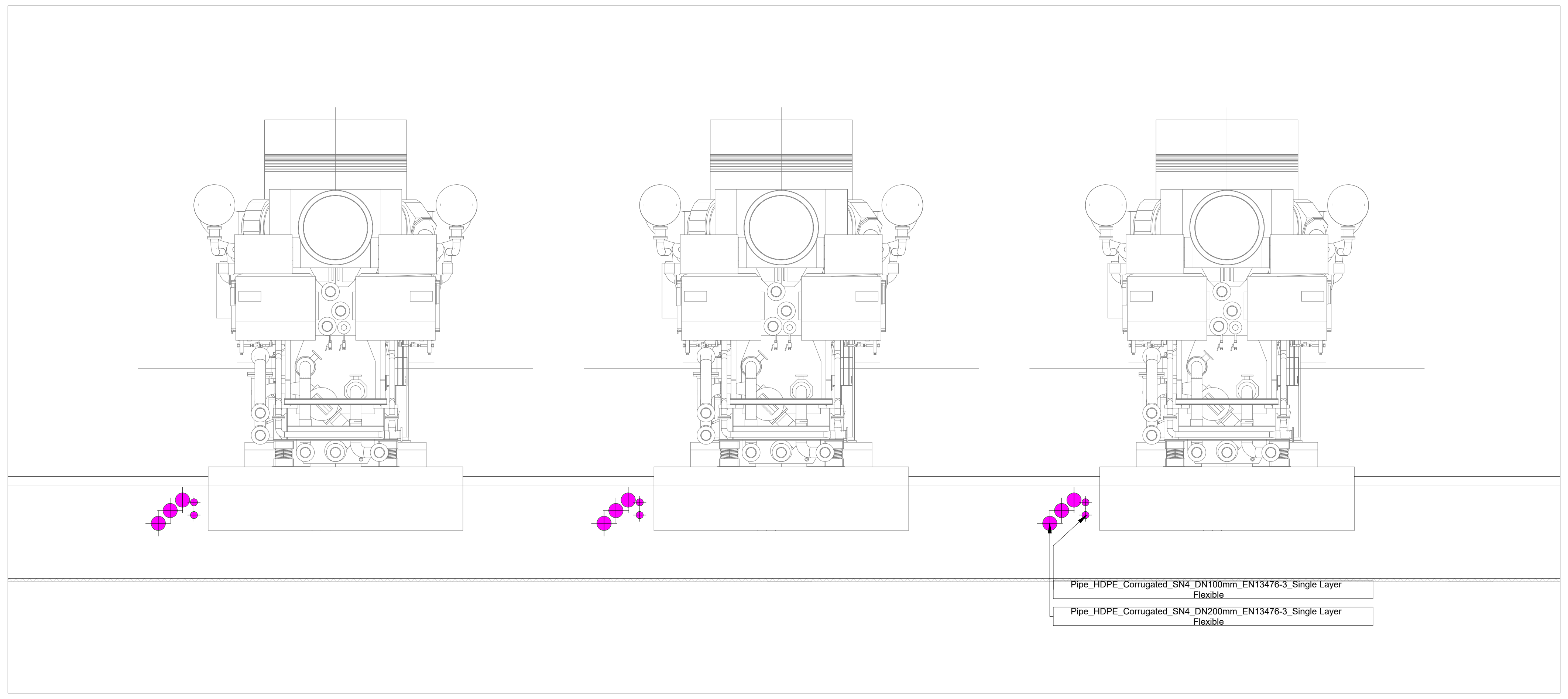
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible

ISOMETRIC VIEW
SCALE:1/50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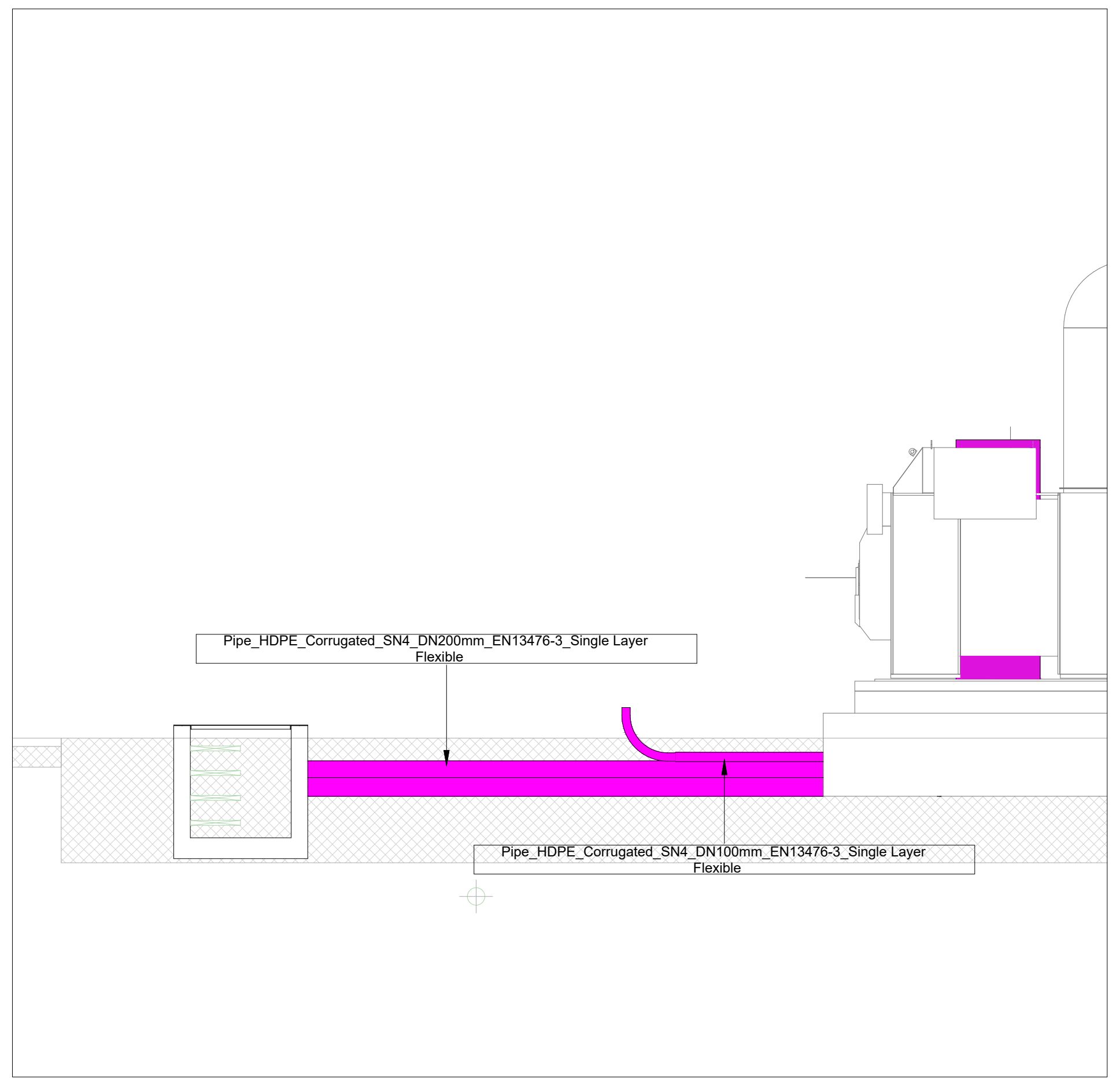
SECTION A1
SCALE:1/50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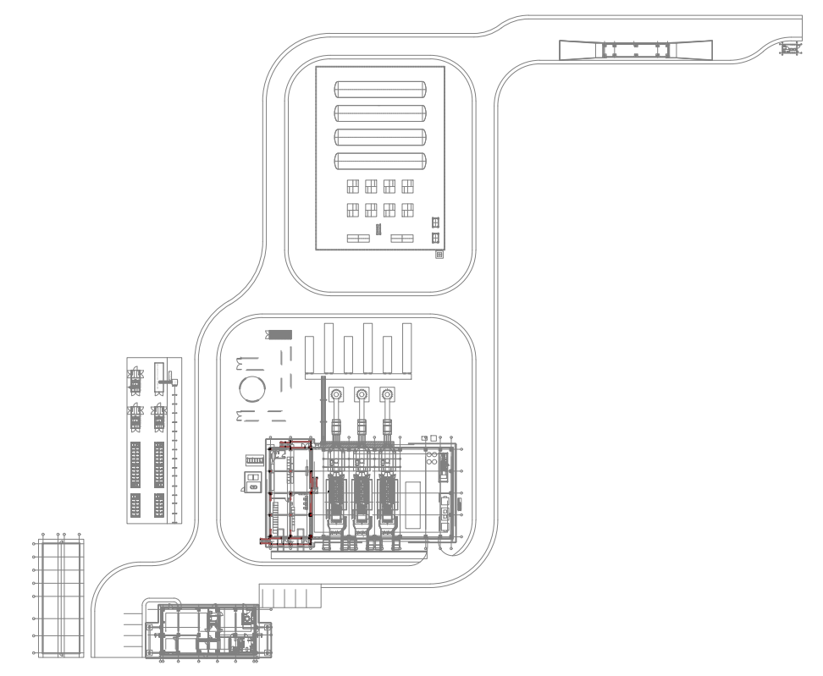
Pipe_HDPE_Corrugated_SN4_DN100mm_EN13476-3_Single Layer Flexible

SECTION A2
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-10-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M, UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
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5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

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iLTEKNO
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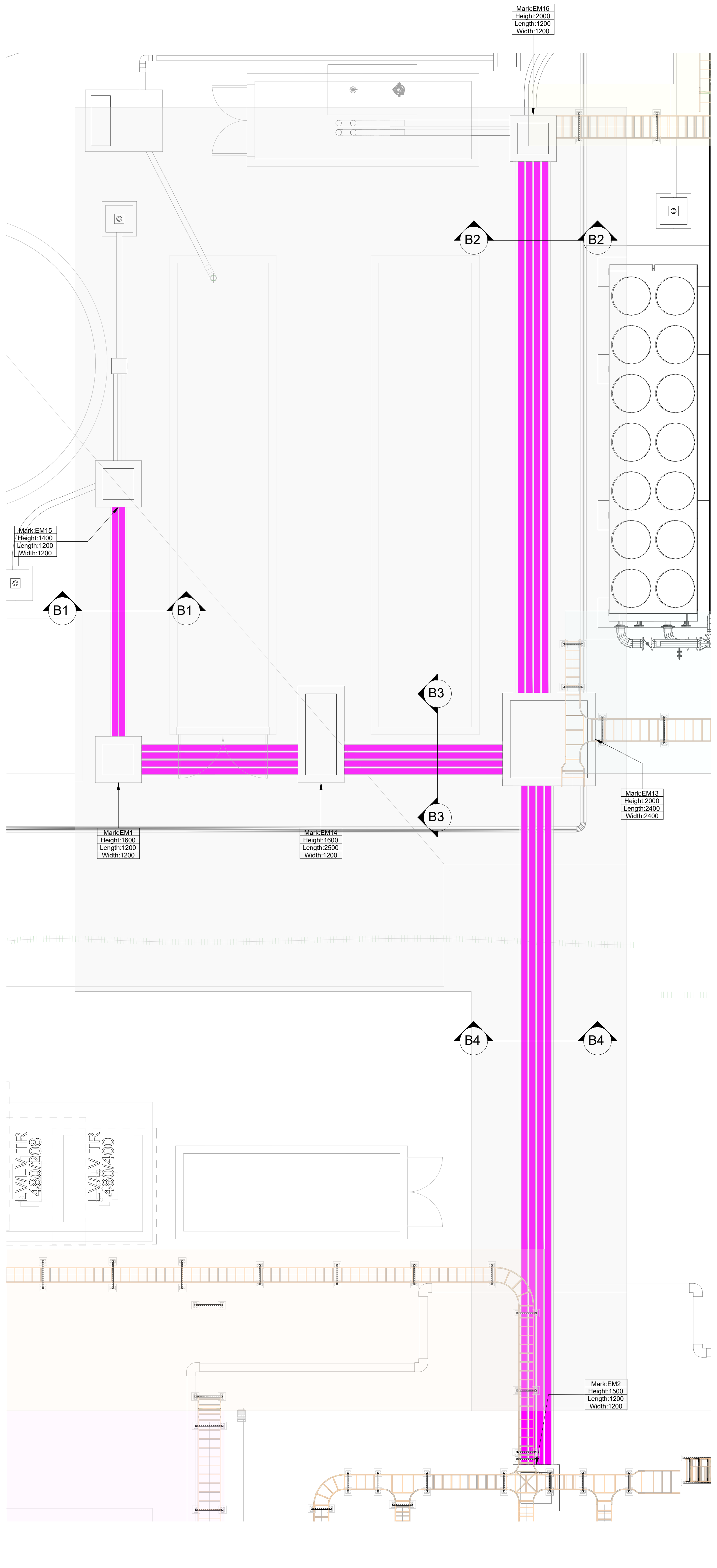
DESIGNER

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

DRAWING NUMBER: ABA-ENG-ELC-DRW-2130
SHEET: 10
OF: 16
DRAWING NAME: POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT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B2
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B1
B3
B3
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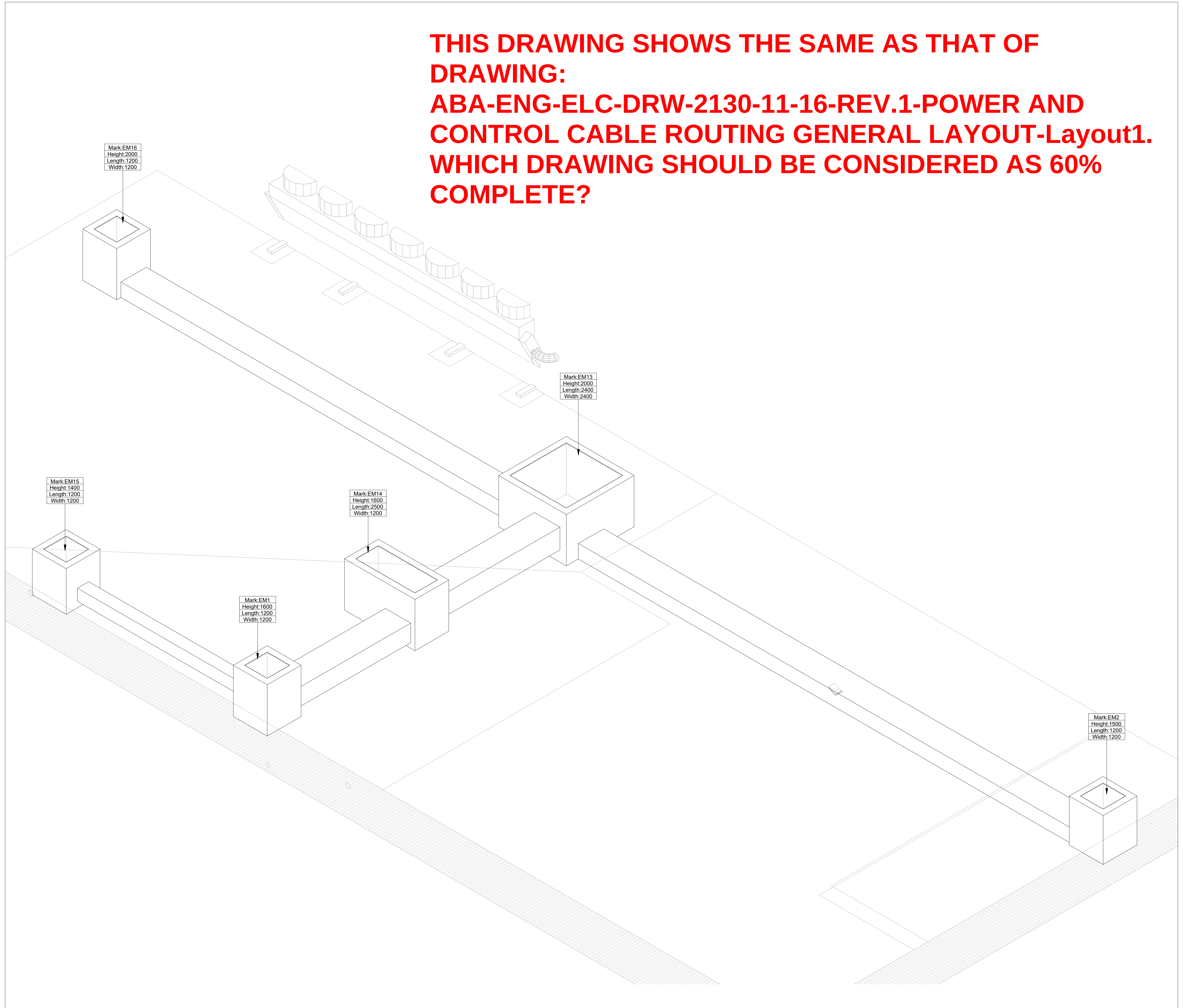
Height:1600
Length:1200
Width:1200
Mark:EM14
Height:1600
Length:2500
Width:1200
Mark:EM13
Height:2000
Length:2400
Width:2400
B4
B4
LV/LV TR
480/208
LV/LV TR
480/400
Mark:EM2
Height:1500
Length:1200
Width:1200

AREA BOP PLAN
SCALE:1/40

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-11-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?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Height:1400
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Width:1200
Mark:EM14
Height:1600
Length:2500
Width:1200
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Width:1200
Mark:EM2
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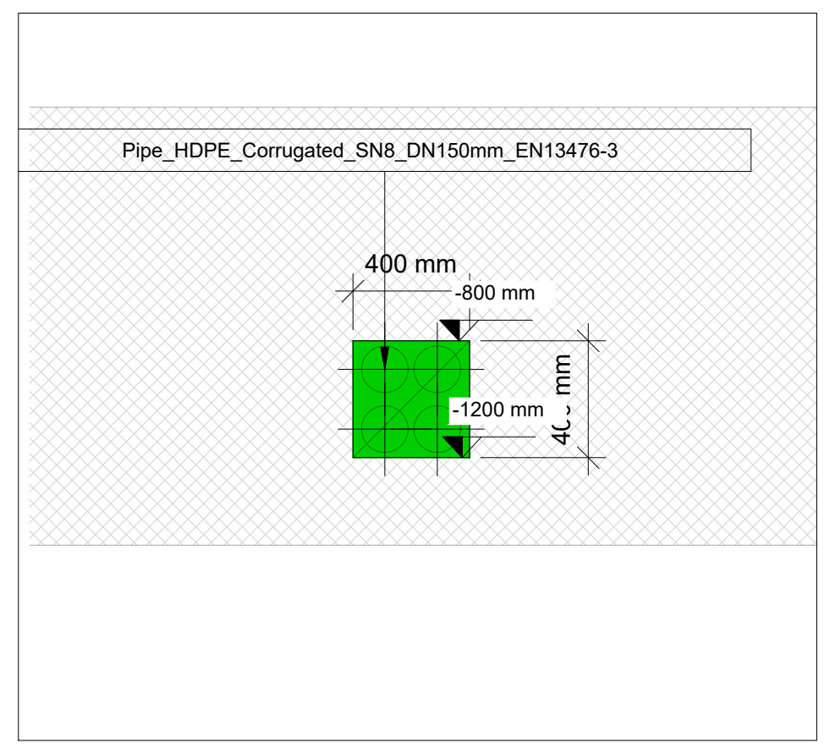
Width:1200

ISOMETRIC VIEW
SCALE:1/50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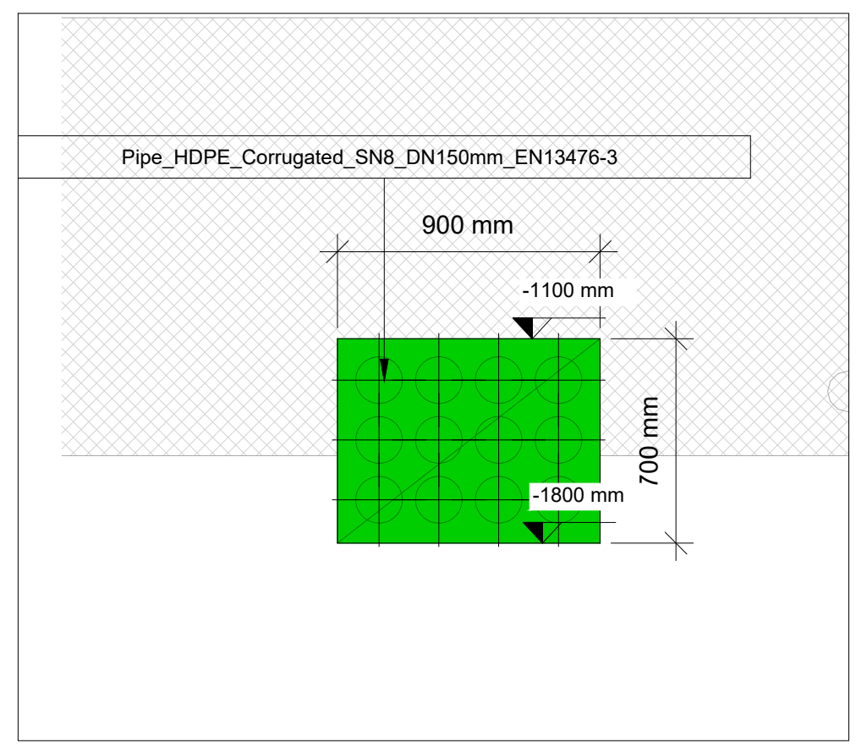
-1200 mm
40 mm

SECTION B1
SCALE:1/50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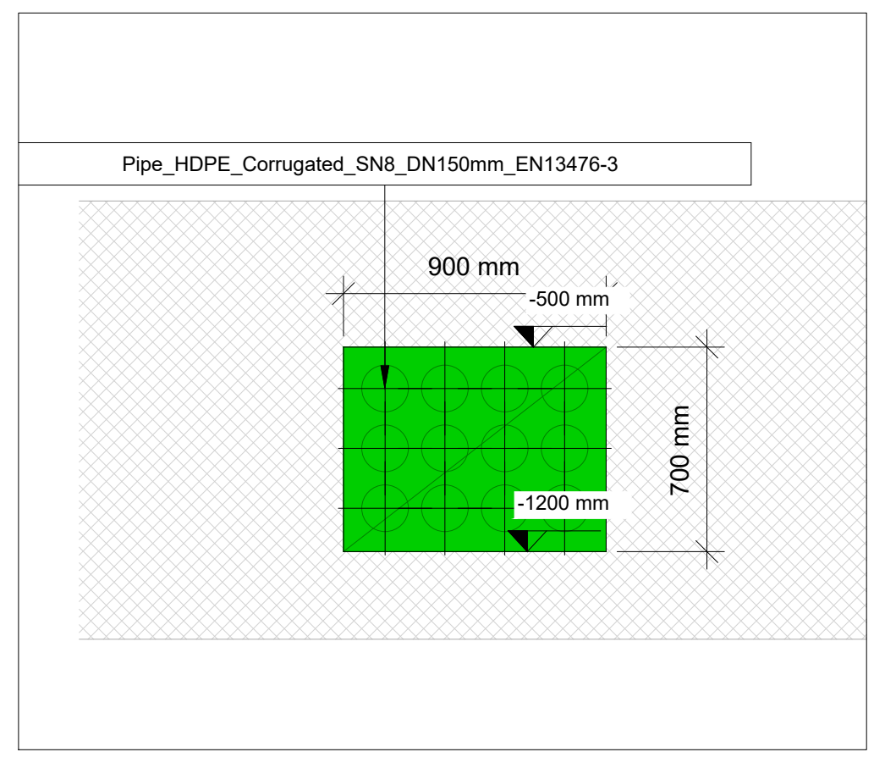
-1800 mm
700 mm

SECTION B2
SCALE:1/50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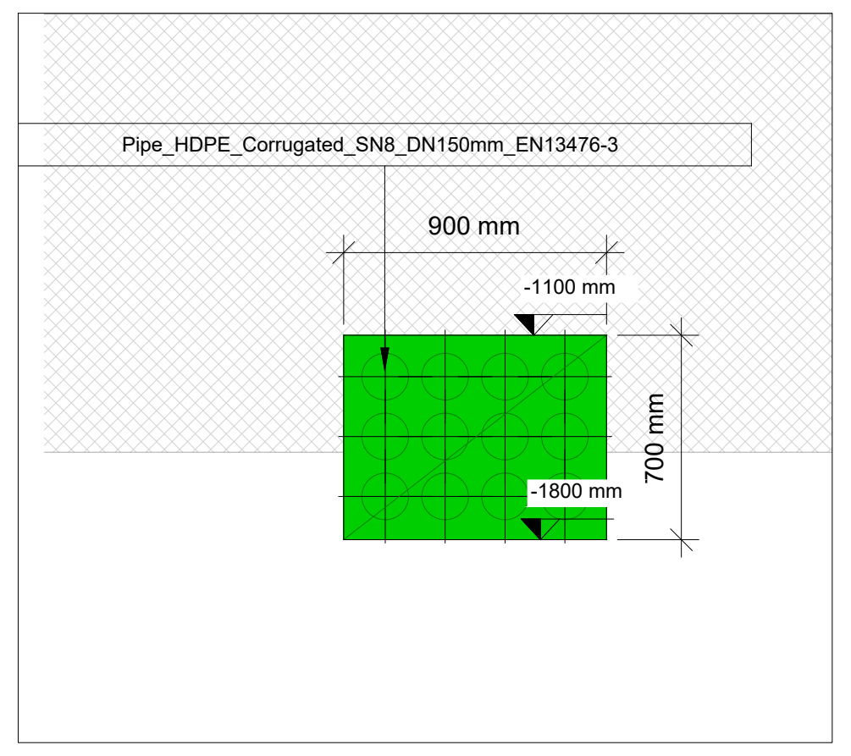
-500 mm
-1200 mm
700 mm

SECTION B3
SCALE:1/50


Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
900 mm
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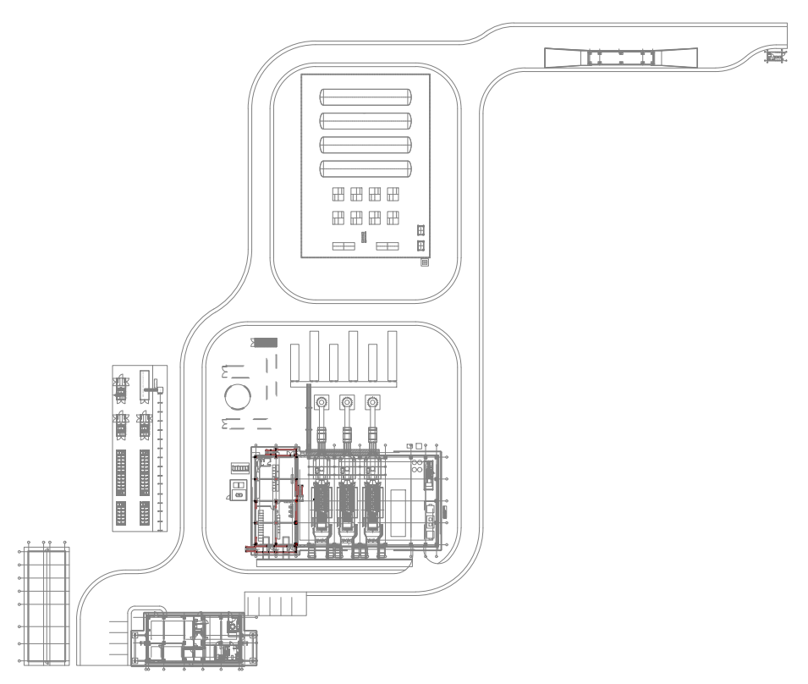
SECTION B4
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

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DESIGNER
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SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

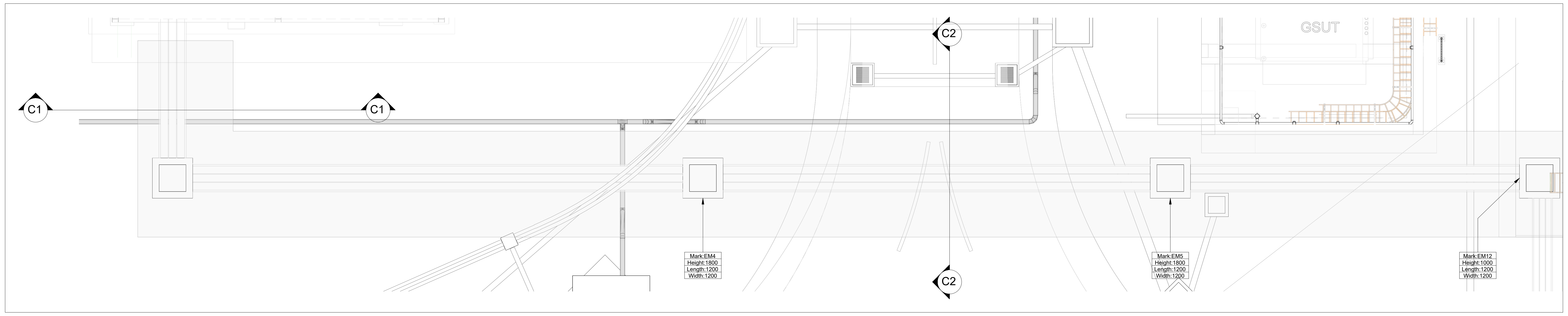
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

SIZE	SCALE
A0	-

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET: 11
OF: 16

DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT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C1
C2
C2
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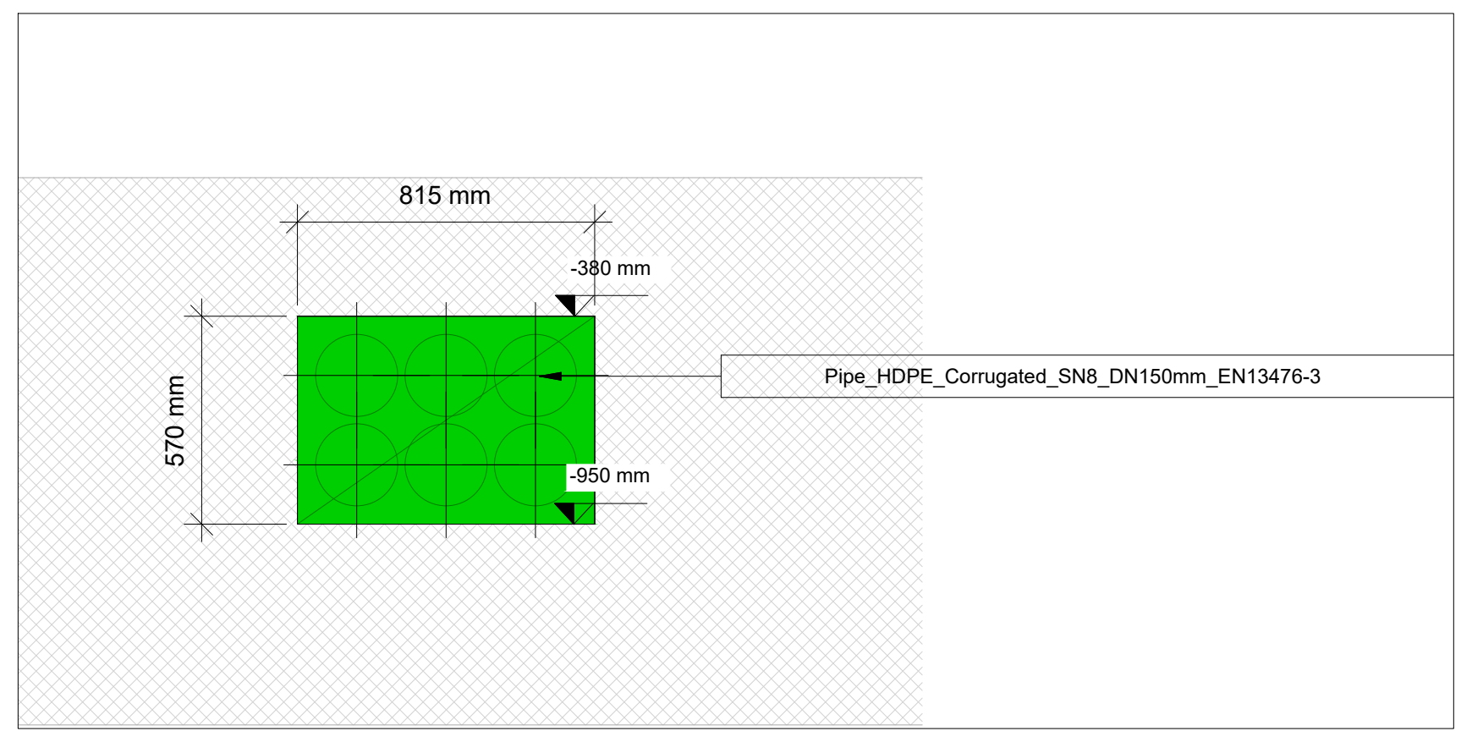
AREA SLR PLAN
SCALE:1/60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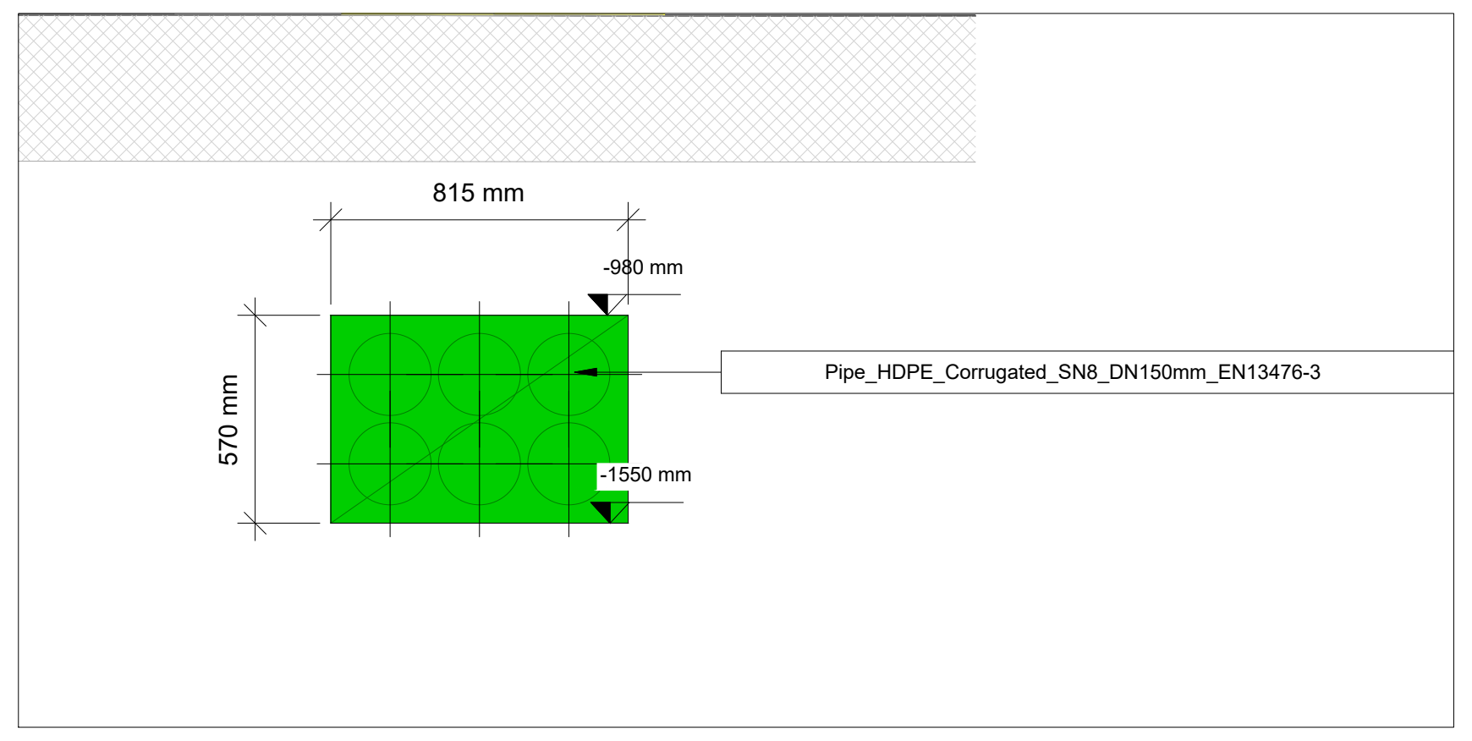
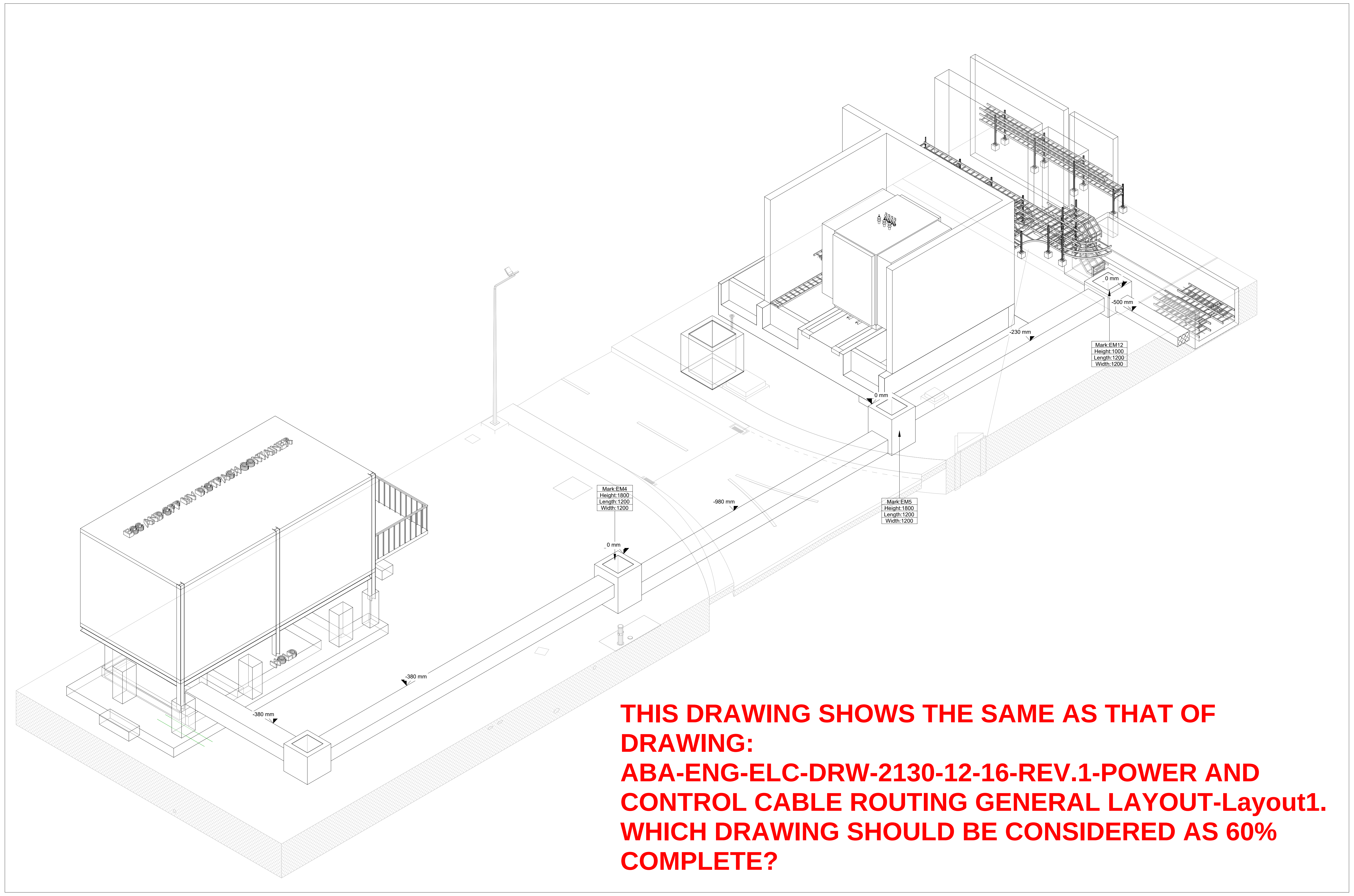
570 mm
-380 mm
-950 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION C1
SCALE:1/50


815 mm
570 mm
-980 mm
-1550 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION C2
SCALE:1/50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Width:1200
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Height:1800
Length:1200
Width:1200
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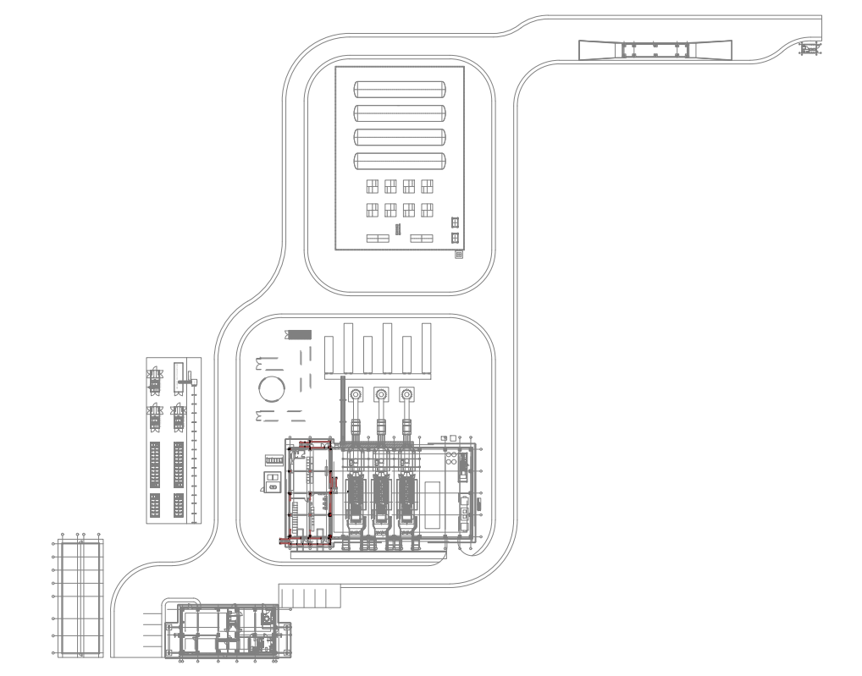
Length:1200
Width:1200
0 mm
0 mm
0 mm
-230 mm
-500 mm
-980 mm
-380 mm
-380 mm

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING:
ABA-ENG-ELC-DRW-2130-12-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

ISOMETRIC VIEW
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

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ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

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NOTES

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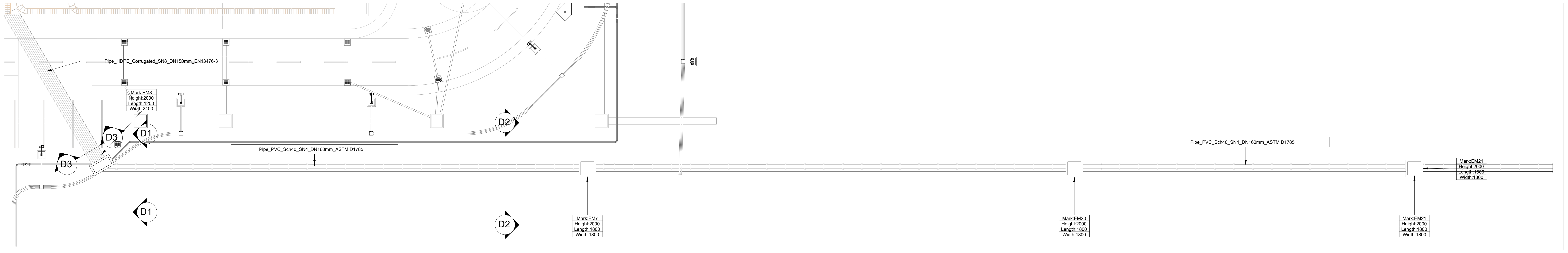
DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

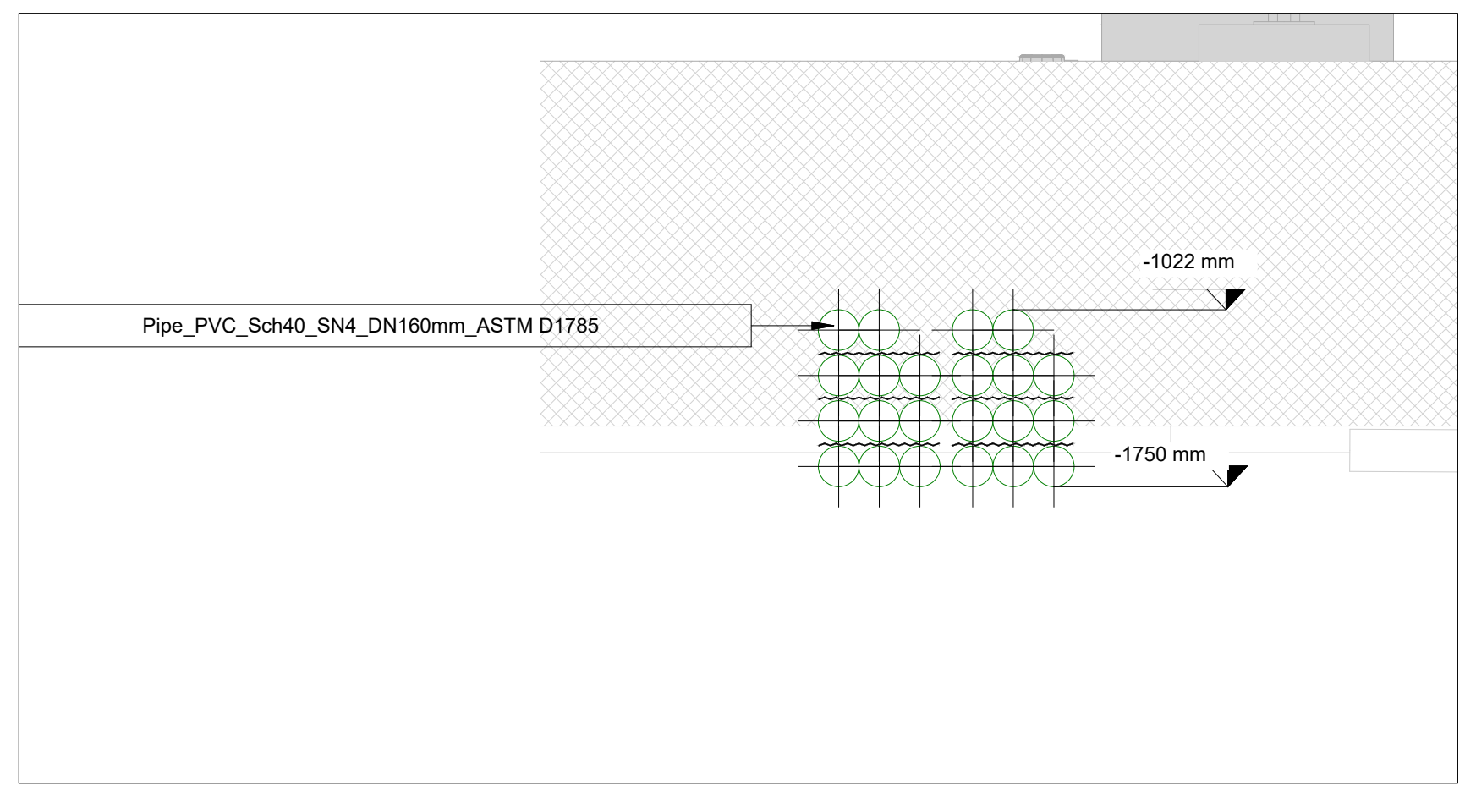
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

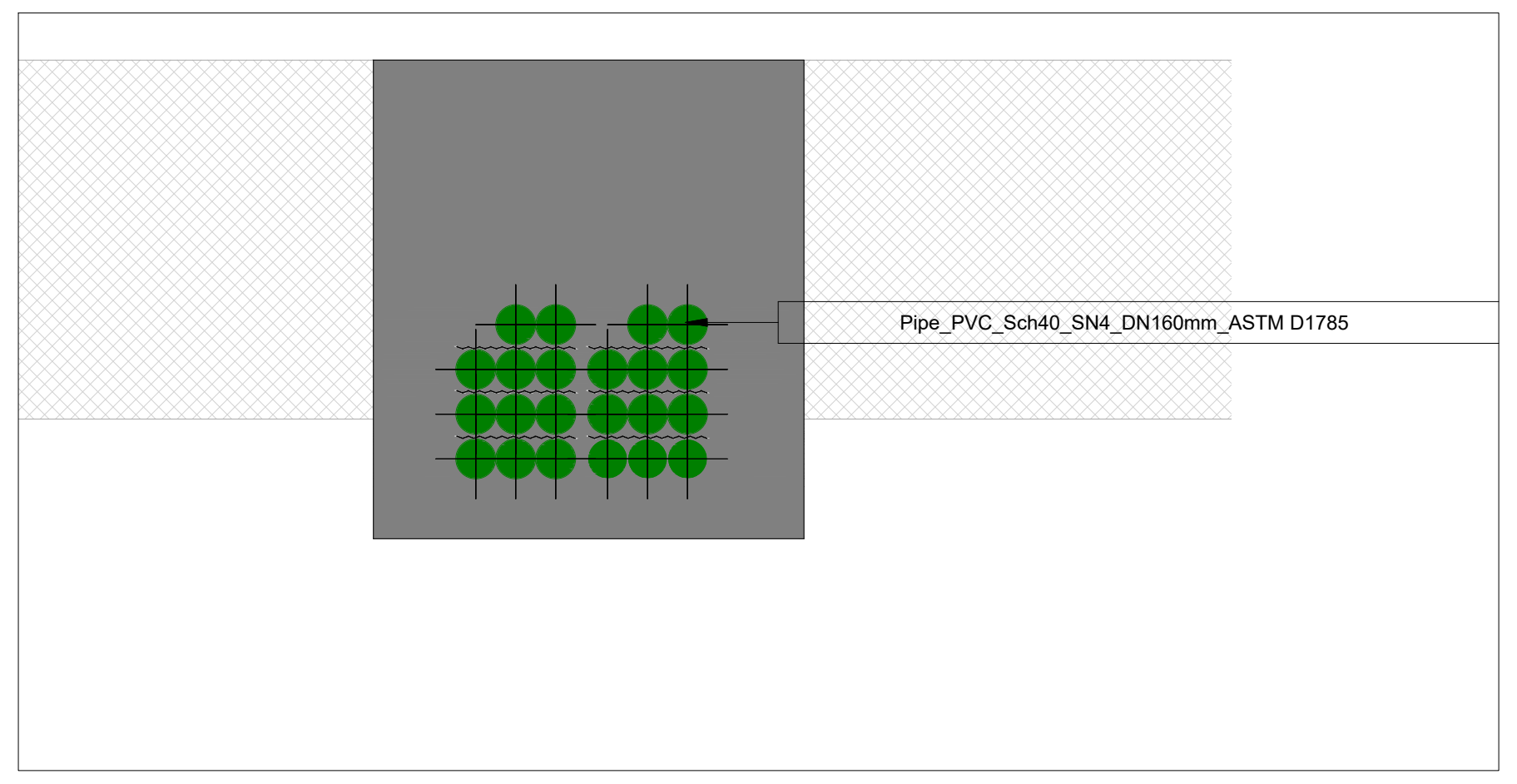
DRAWING NUMBER: ABA-ENG-ELC-DRW-2130
SHEET: 12
OF: 16
DRAWING NAME: POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM8
Height:2000
Length:1200
Width:2400
D3
D3
D1
D1
D2
D2
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Mark:EM7
Height:2000
Length:1800
Width:1800
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Mark:EM20
Height:2000
Length:1800
Width:1800
Mark:EM21
Height:2000
Length:1800
Width:1800
Mark:EM21
Height:2000
Length:1800
Width:1800

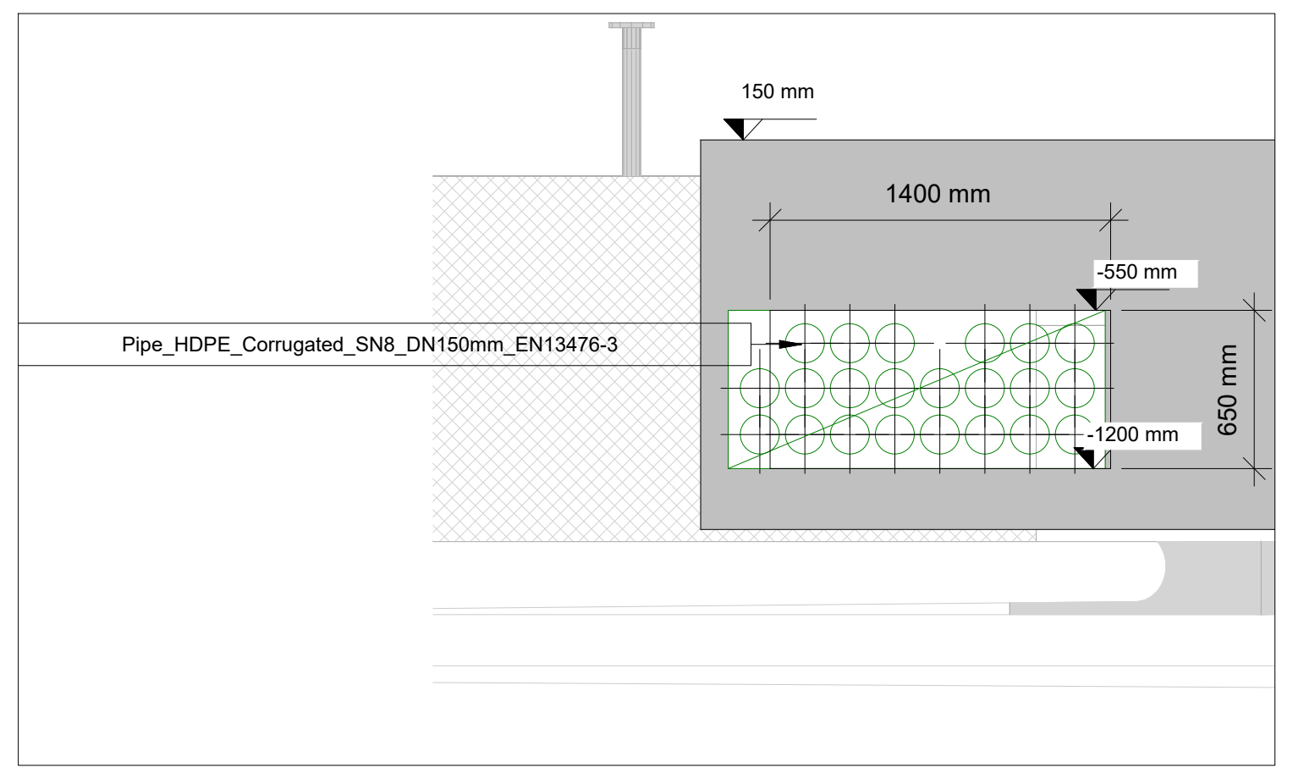
AREA BPL PLAN
SCALE:1/60


Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
-1022 mm
-1750 mm

SECTION D1
SCALE:1/50

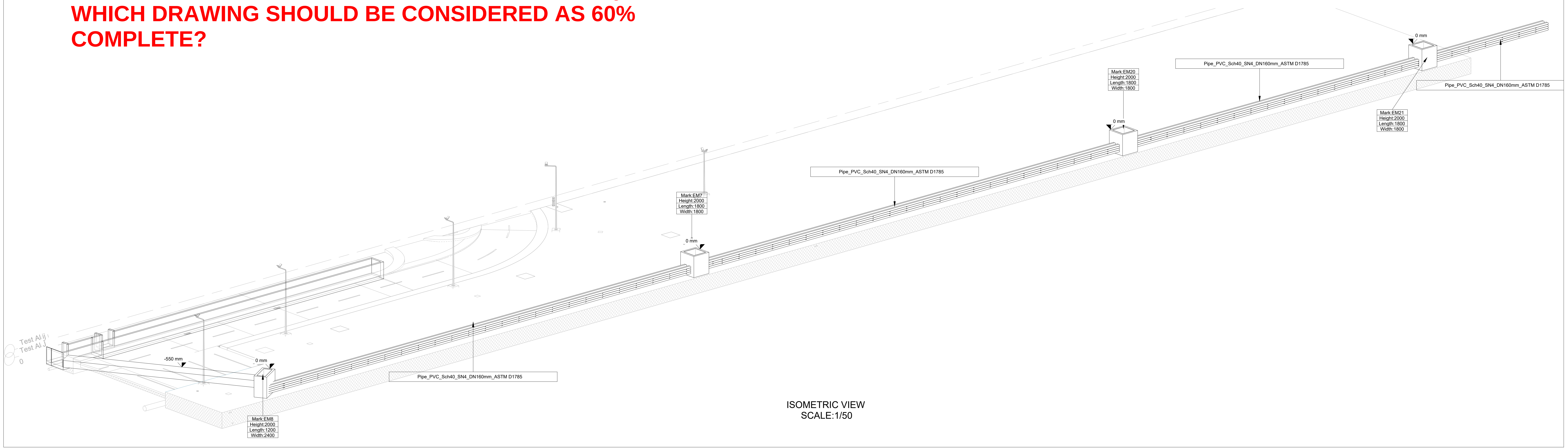

Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785

SECTION D2
SCALE:1/50


150 mm
1400 mm
-550 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
-1200 mm
650 mm

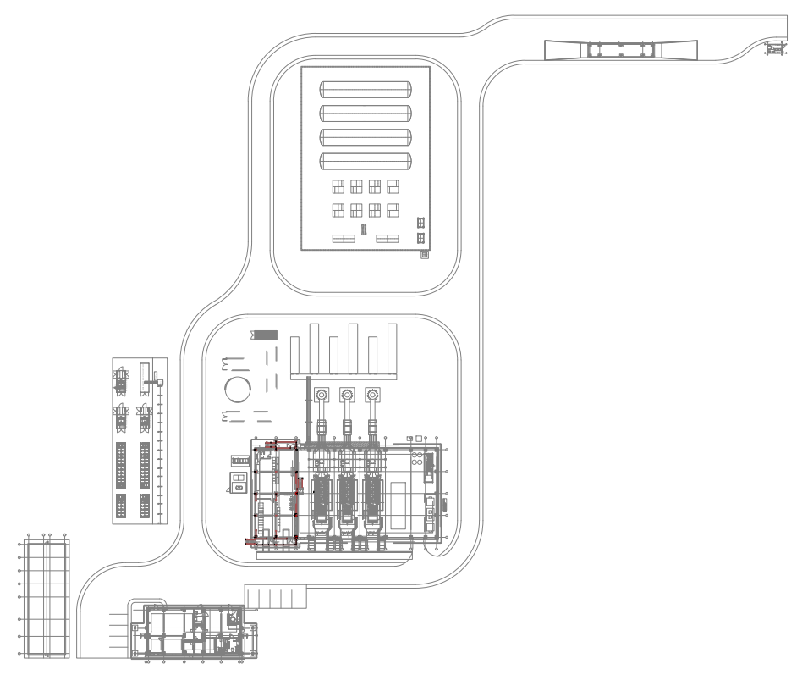
SECTION D3
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-13-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


0 mm
Mark:EM21
Height:2000
Length:1800
Width:1800
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Mark:EM20
Height:2000
Length:1800
Width:1800
0 mm
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Mark:EM7
Height:2000
Length:1800
Width:1800
0 mm
Test Al.ij
Test Al.Ĵ
0
-550 mm
0 mm
Pipe_PVC_Sch40_SN4_DN160mm_ASTM D1785
Mark:EM8
Height:2000
Length:1200
Width:2400

ISOMETRIC VIEW
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M, UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISCIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS, AND CIVIL DRAWINGS, MISMATCHES SHOULD BE INFORMED TO THE DESIGNER
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

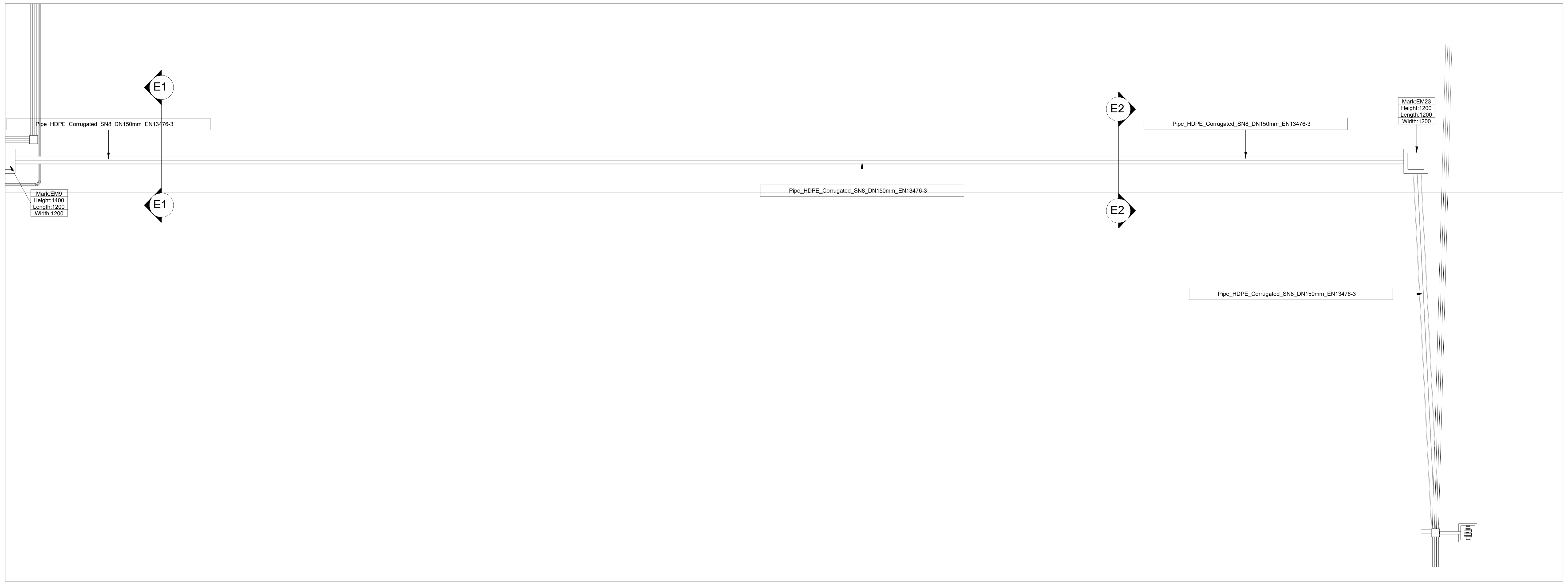
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

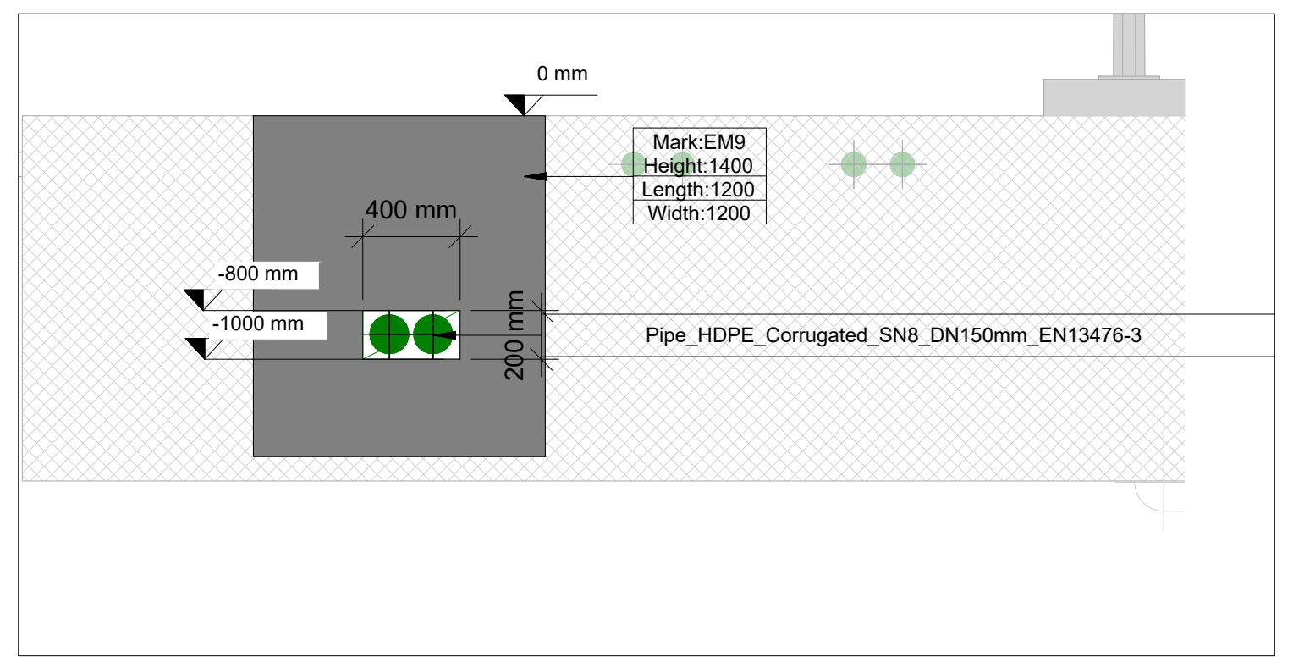
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET: 13
OF: 16

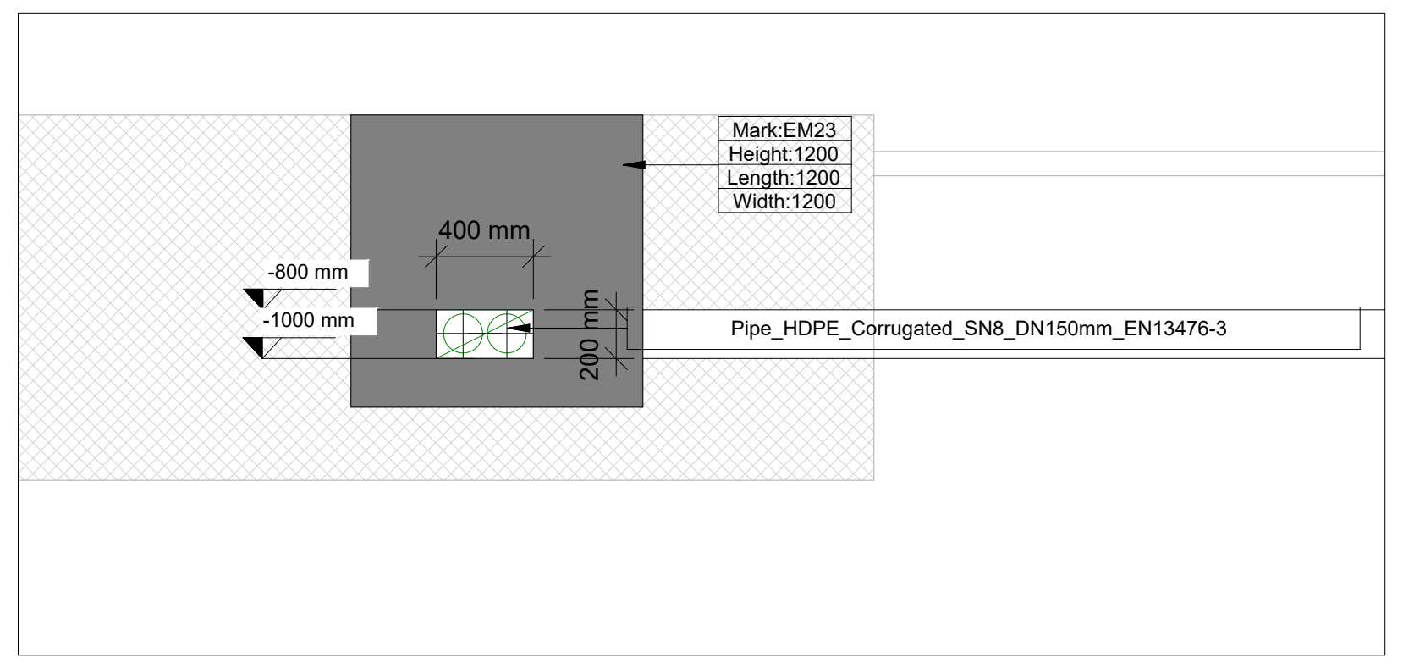
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


E1
E1
E2
E2
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM9
Height:1400
Length:1200
Width:1200
Mark:EM23
Height:1200
Length:1200
Width:1200

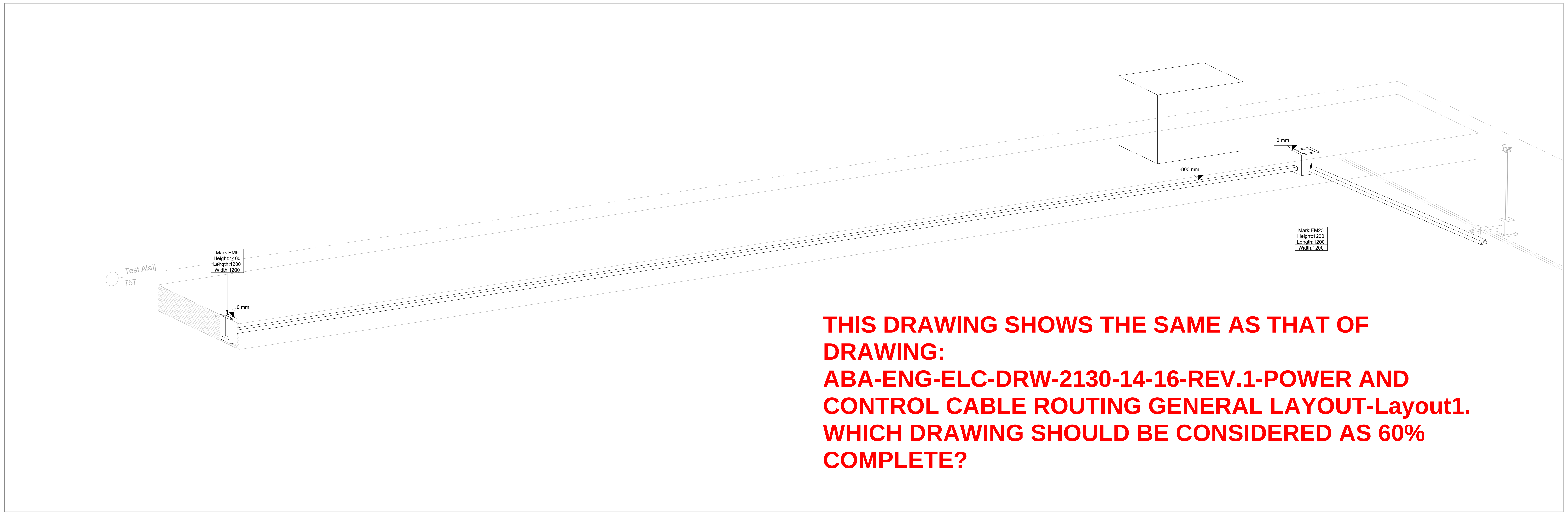
AREA EFL PLAN
SCALE:1/60


0 mm
Mark:EM9
Height:1400
Length:1200
Width:1200
400 mm
-800 mm
-1000 mm
200 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION E1
SCALE:1/50


Mark:EM23
Height:1200
Length:1200
Width:1200
400 mm
-800 mm
-1000 mm
200 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

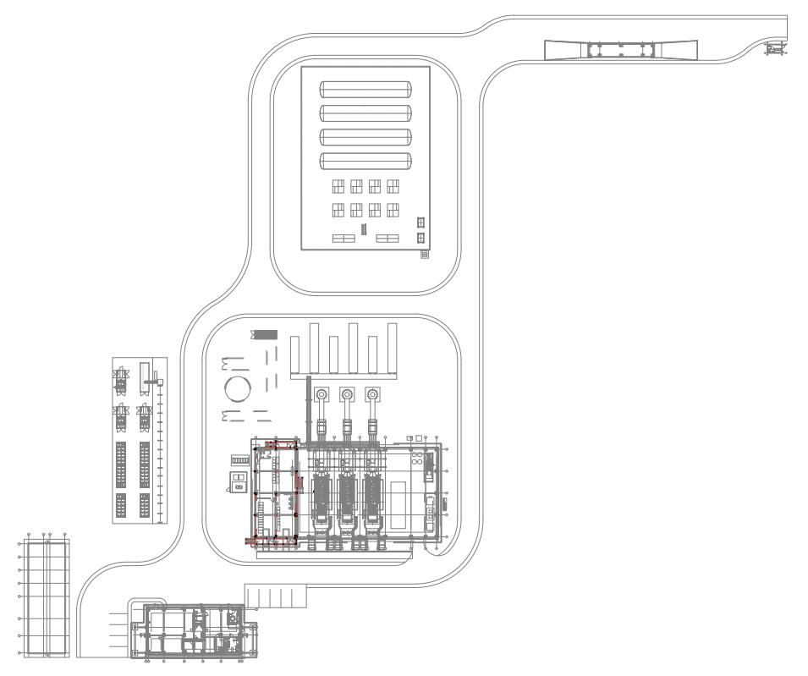
SECTION E2
SCALE:1/50


0 mm
-800 mm
Mark:EM23
Height:1200
Length:1200
Width:1200
Mark:EM9
Height:1400
Length:1200
Width:1200
0 mm

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-14-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

ISOMETRIC VIEW
SCALE:1/100

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

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5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

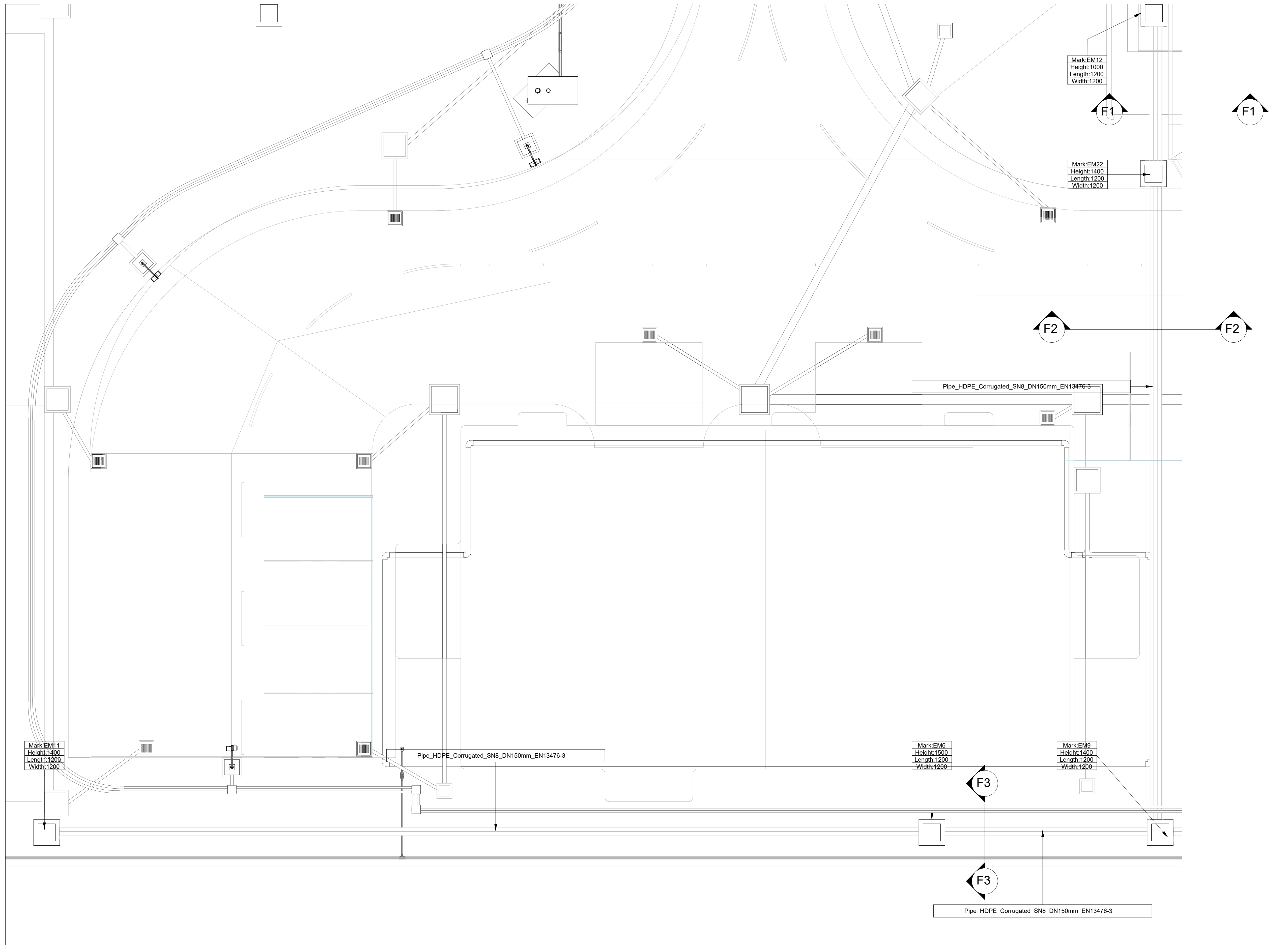
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

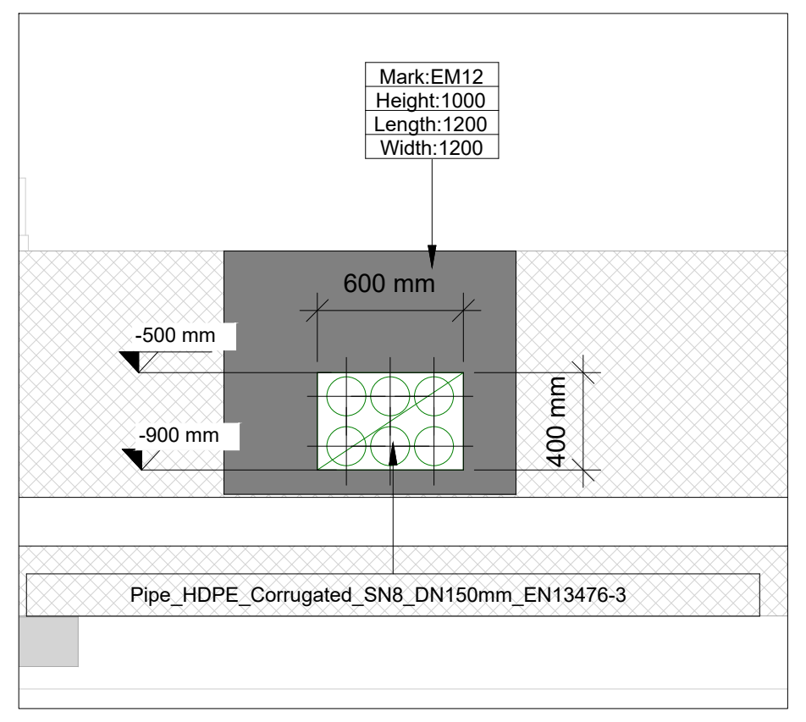
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET:
14
OF:
16

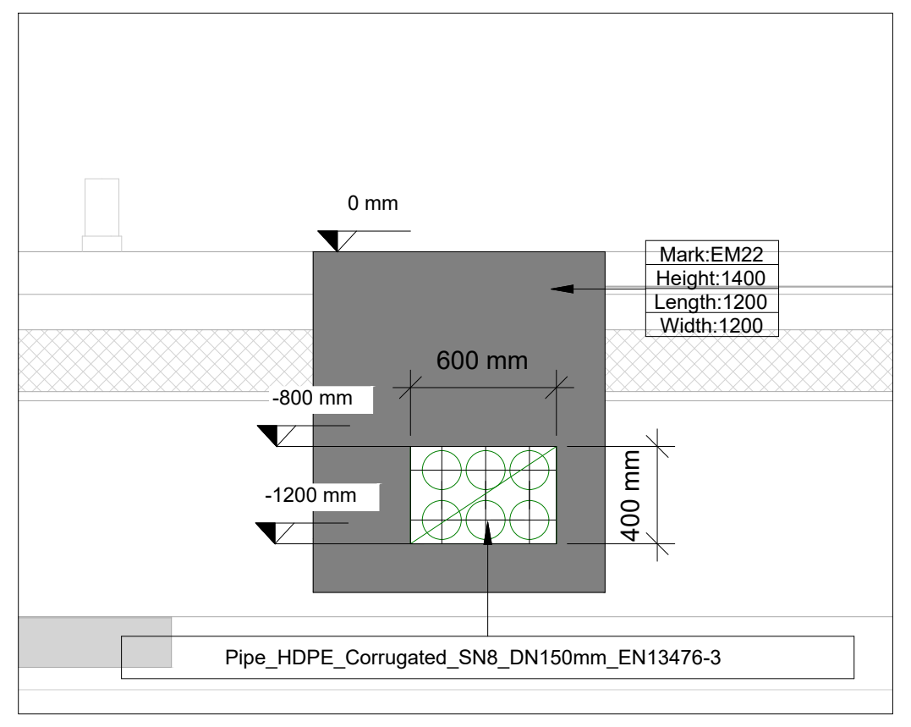
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


Mark:EM12
Height:1000
Length:1200
Width:1200
F1
F1
Mark:EM22
Height:1400
Length:1200
Width:1200
F2
F2
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM11
Height:1400
Length:1200
Width:1200
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM6
Height:1500
Length:1200
Width:1200
Mark:EM9
Height:1400
Length:1200
Width:1200
F3
F3
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

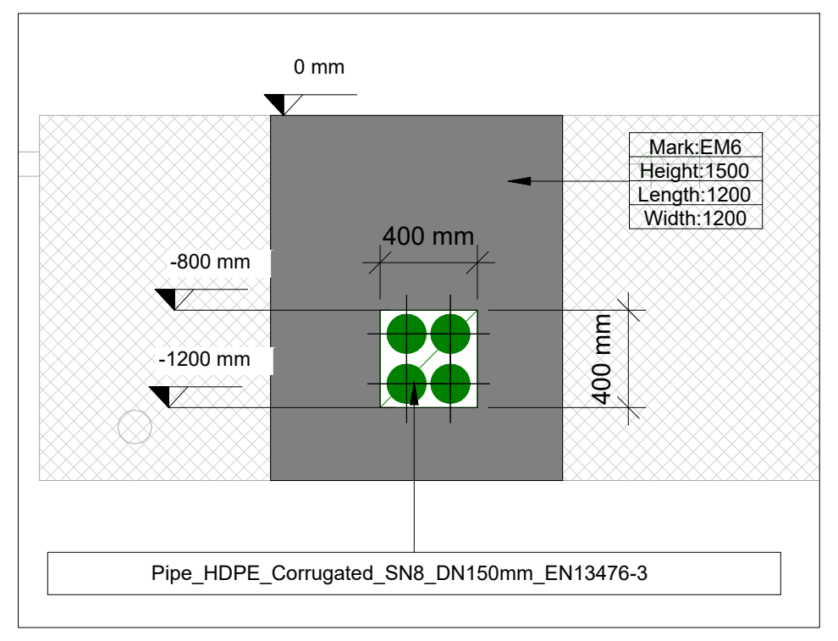
AREA ADM PLAN
SCALE:1/60


Mark:EM12
Height:1000
Length:1200
Width:1200
600 mm
-500 mm
-900 mm
400 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION F1
SCALE:1/50

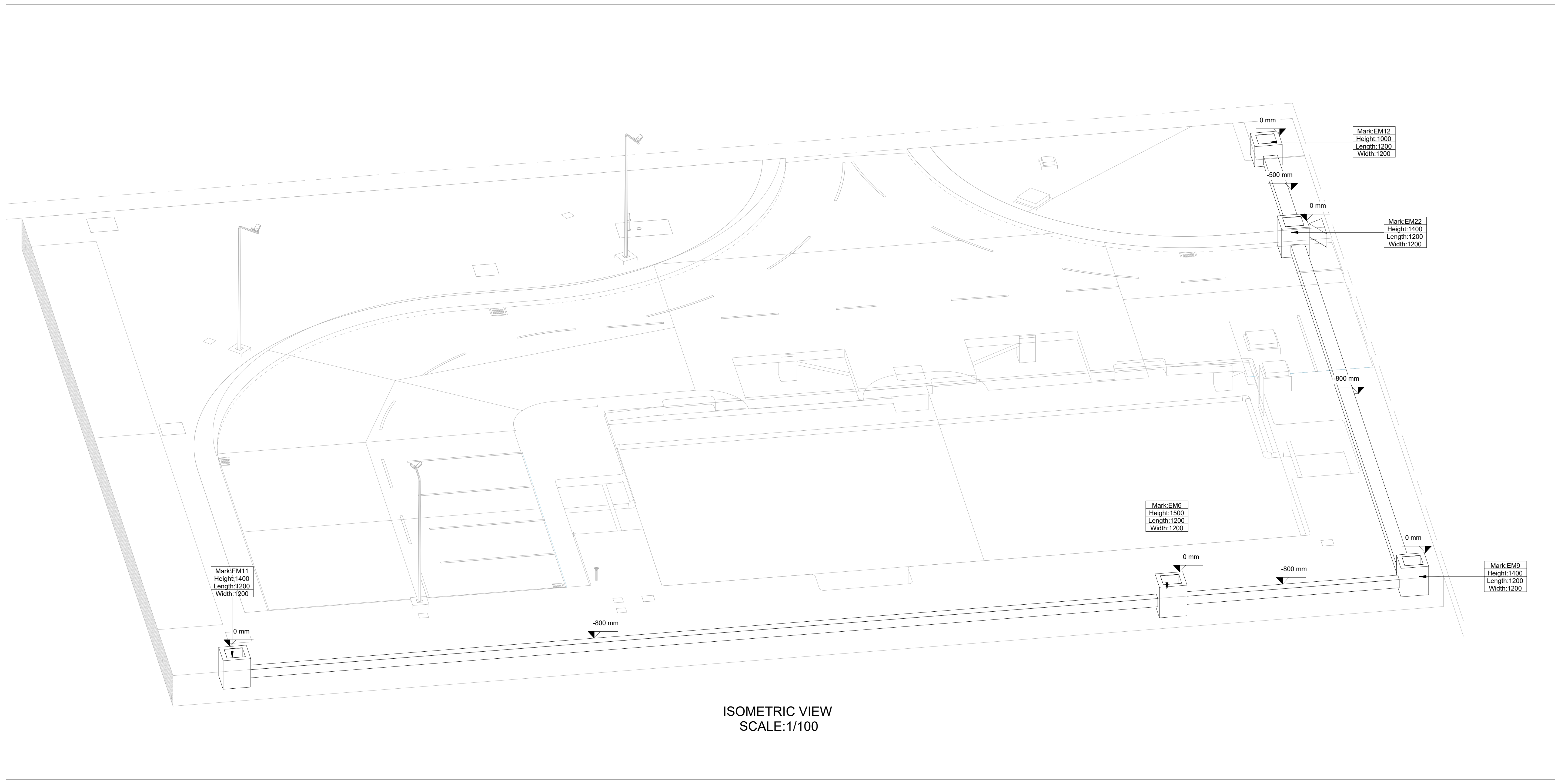

0 mm
Mark:EM22
Height:1400
Length:1200
Width:1200
600 mm
-800 mm
-1200 mm
400 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION F2
SCALE:1/50


0 mm
Mark:EM6
Height:1500
Length:1200
Width:1200
400 mm
-800 mm
-1200 mm
400 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

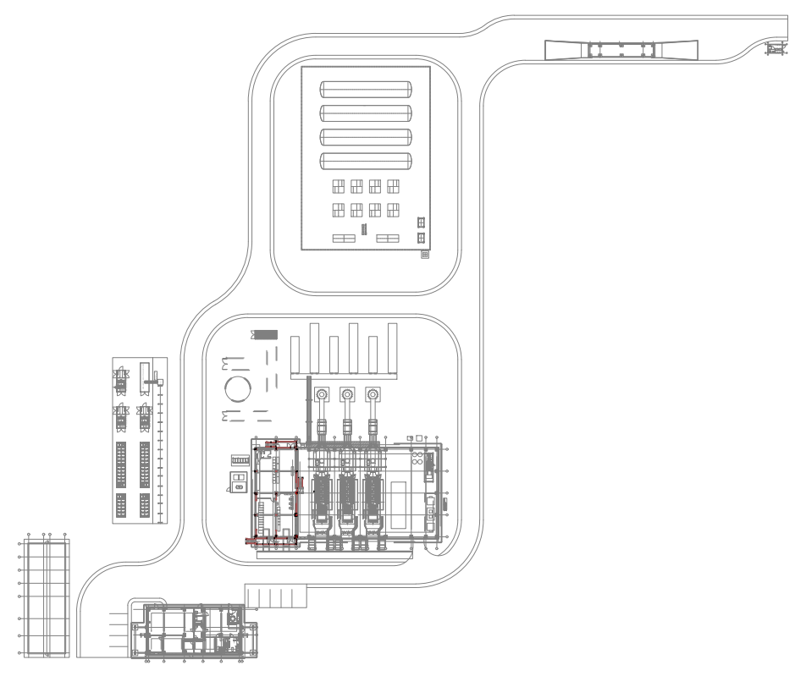
SECTION F3
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-15-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


0 mm
Mark:EM12
Height:1000
Length:1200
Width:1200
-500 mm
0 mm
Mark:EM22
Height:1400
Length:1200
Width:1200
-800 mm
0 mm
Mark:EM6
Height:1500
Length:1200
Width:1200
0 mm
-800 mm
Mark:EM9
Height:1400
Length:1200
Width:1200
Mark:EM11
Height:1400
Length:1200
Width:1200
0 mm
-800 mm

ISOMETRIC VIEW
SCALE:1/100

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
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NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

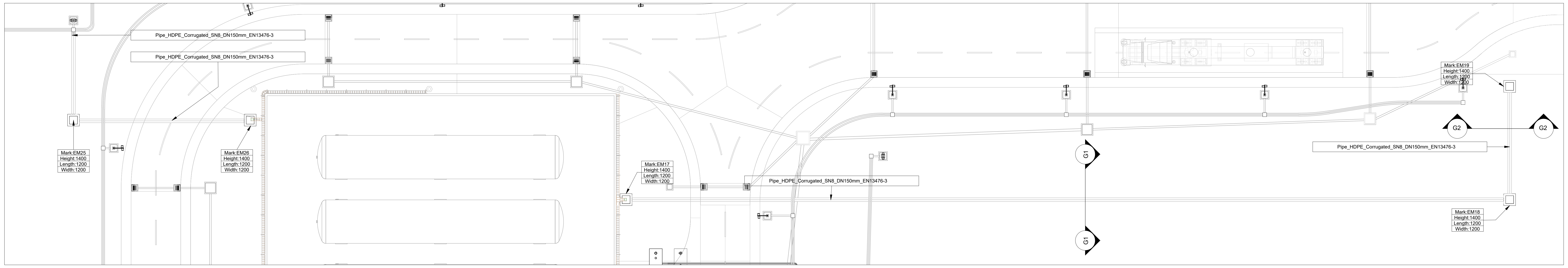
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET:
15
OF:
16

DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT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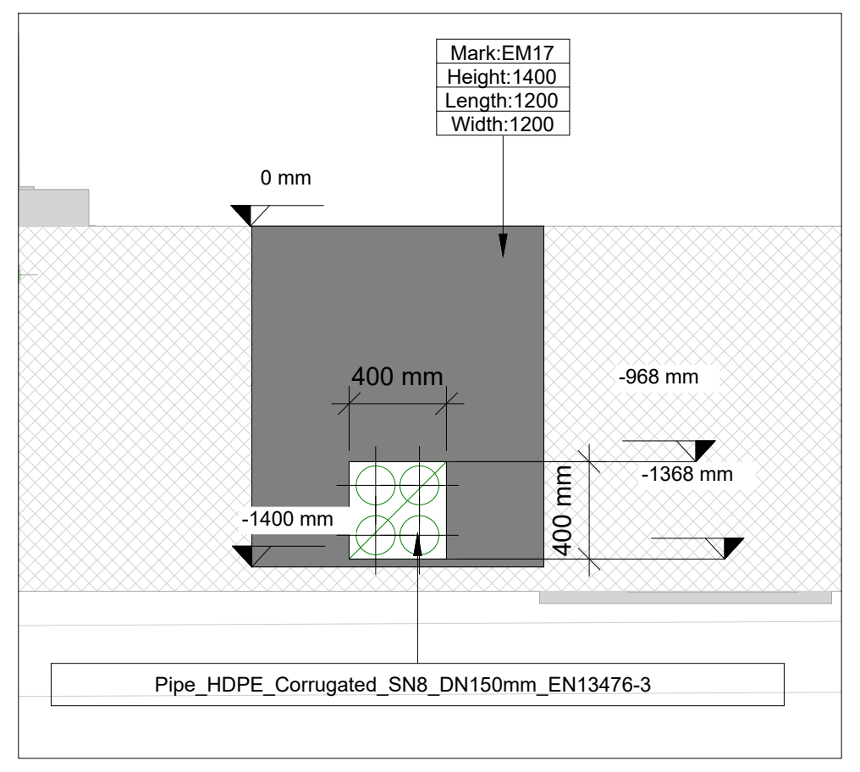
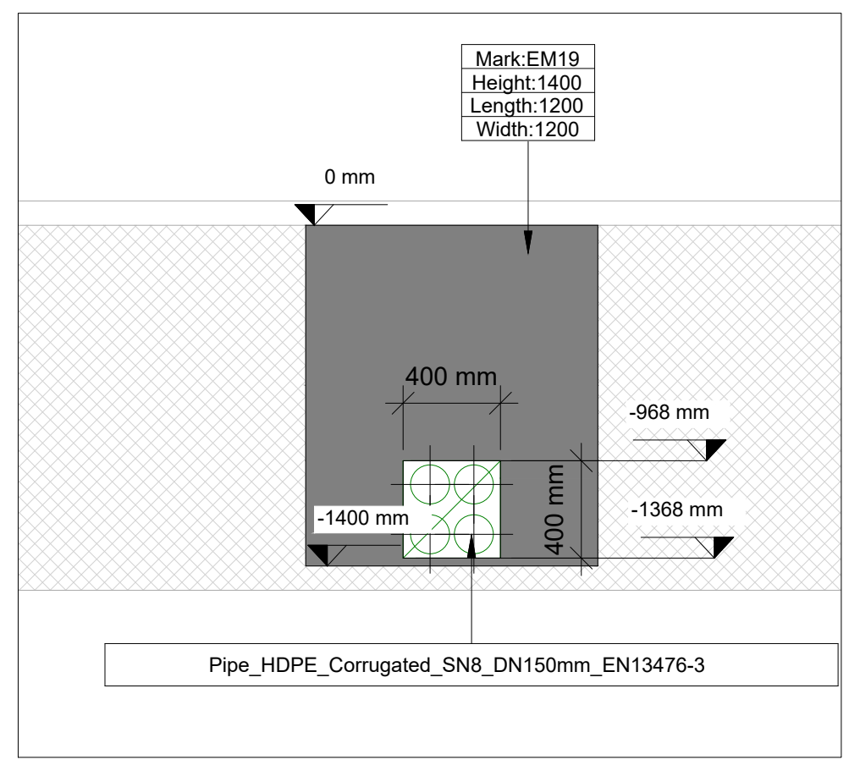
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM25
Height:1400
Length:1200
Width:1200
Mark:EM26
Height:1400
Length:1200
Width:1200
Mark:EM17
Height:1400
Length:1200
Width:1200
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM19
Height:1400
Length:1200
Width:1200
G2
G2
G1
G1
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3
Mark:EM18
Height:1400
Length:1200
Width:1200

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-16-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1. WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

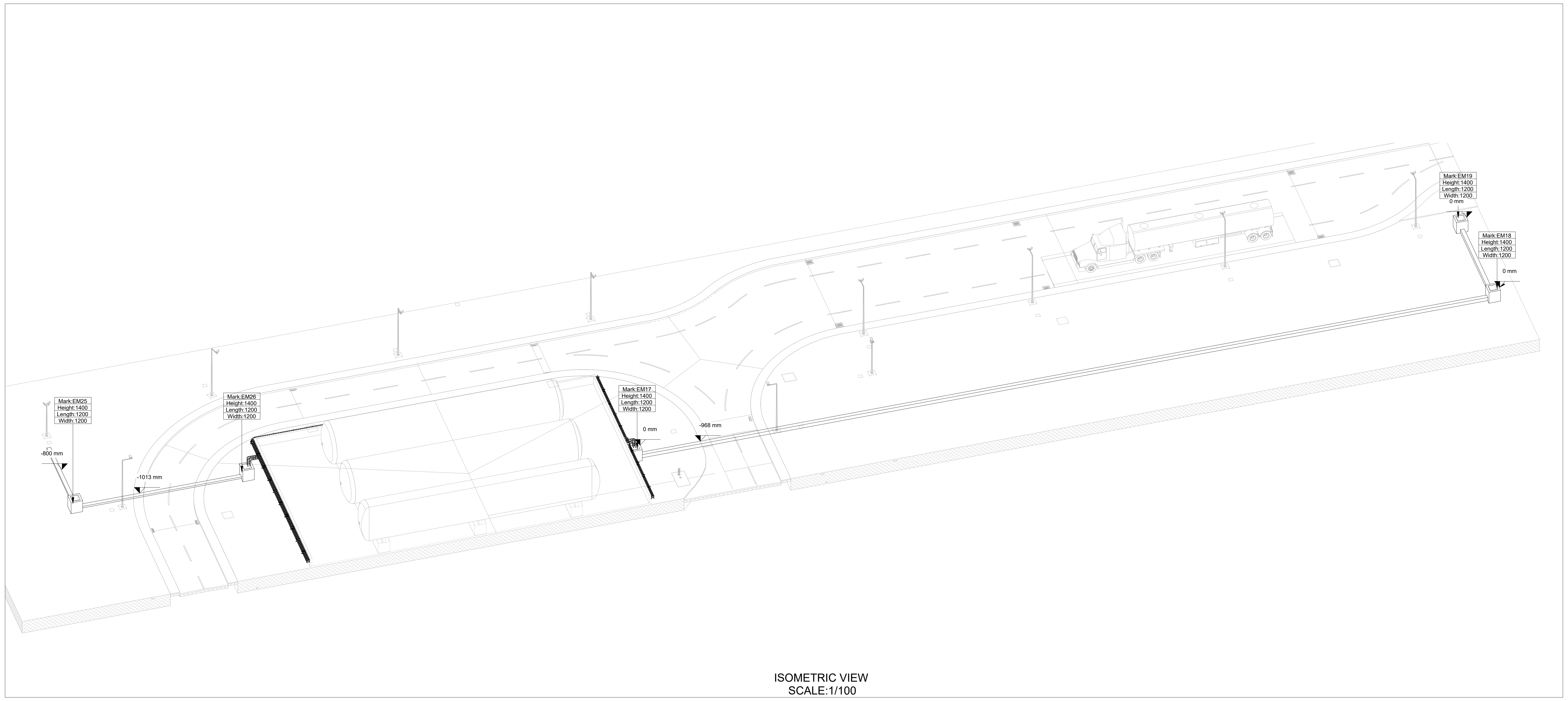
AREA GTH PLAN
SCALE:1/60


Mark:EM17
Height:1400
Length:1200
Width:1200
0 mm
400 mm
-968 mm
-1368 mm
-1400 mm
400 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION G1
SCALE:1/50

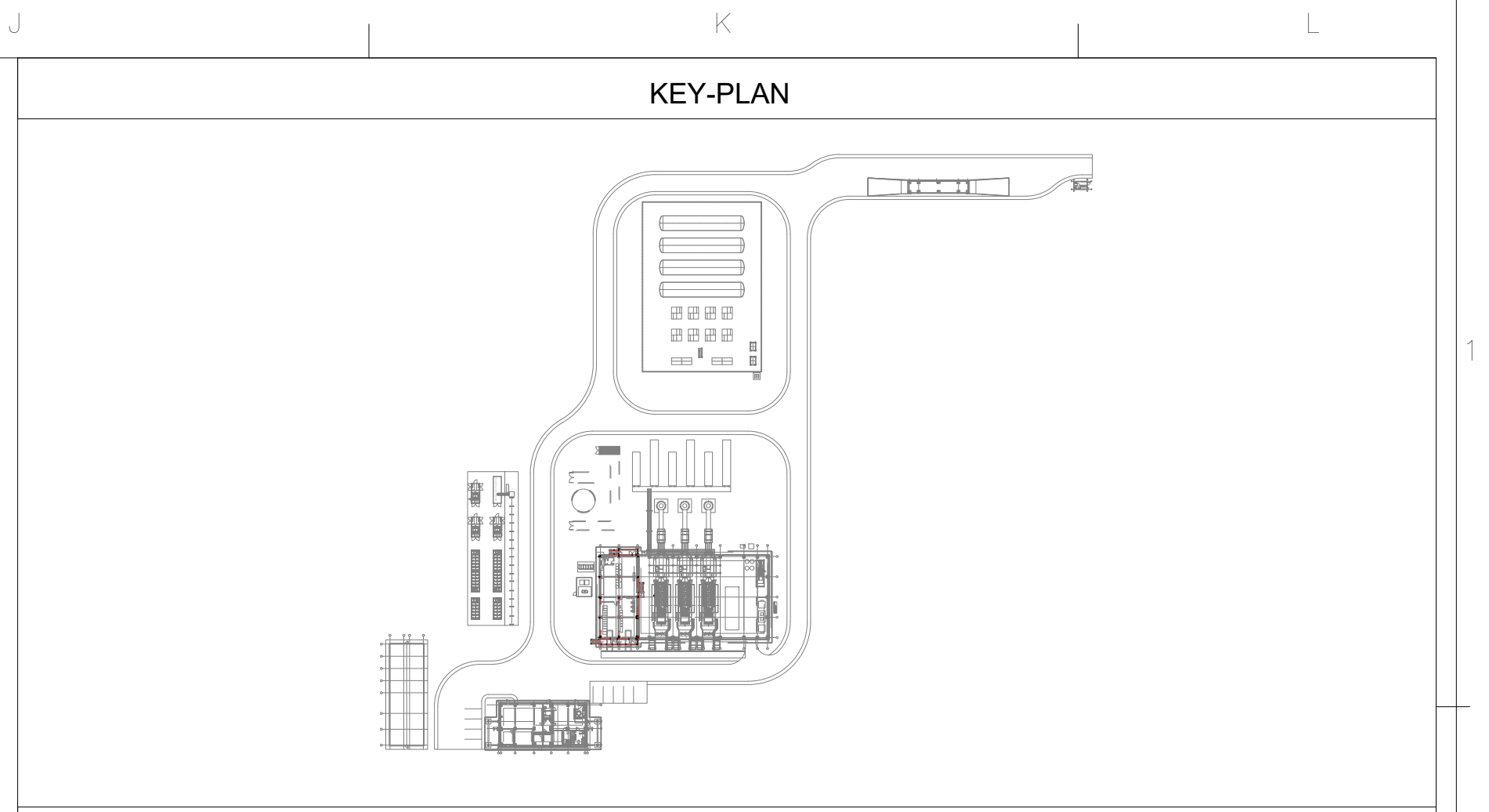

Mark:EM19
Height:1400
Length:1200
Width:1200
0 mm
400 mm
-968 mm
-1368 mm
-1400 mm
400 mm
Pipe_HDPE_Corrugated_SN8_DN150mm_EN13476-3

SECTION G2
SCALE:1/50


Mark:EM19
Height:1400
Length:1200
Width:1200
0 mm
Mark:EM18
Height:1400
Length:1200
Width:1200
0 mm
Mark:EM17
Height:1400
Length:1200
Width:1200
0 mm
-968 mm
Mark:EM26
Height:1400
Length:1200
Width:1200
Mark:EM25
Height:1400
Length:1200
Width:1200
-800 mm
-1013 mm

ISOMETRIC VIEW
SCALE:1/100

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

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NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

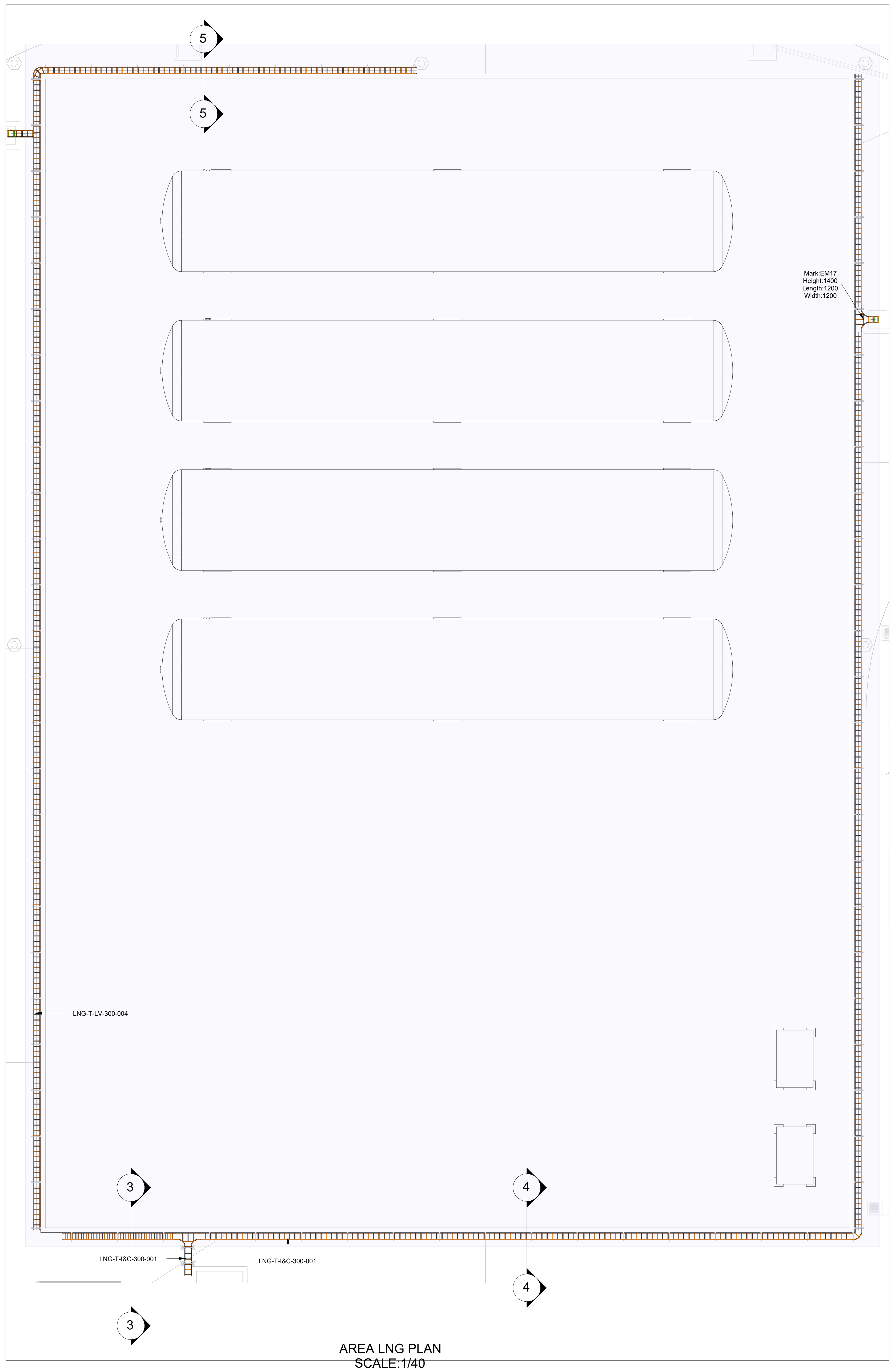
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

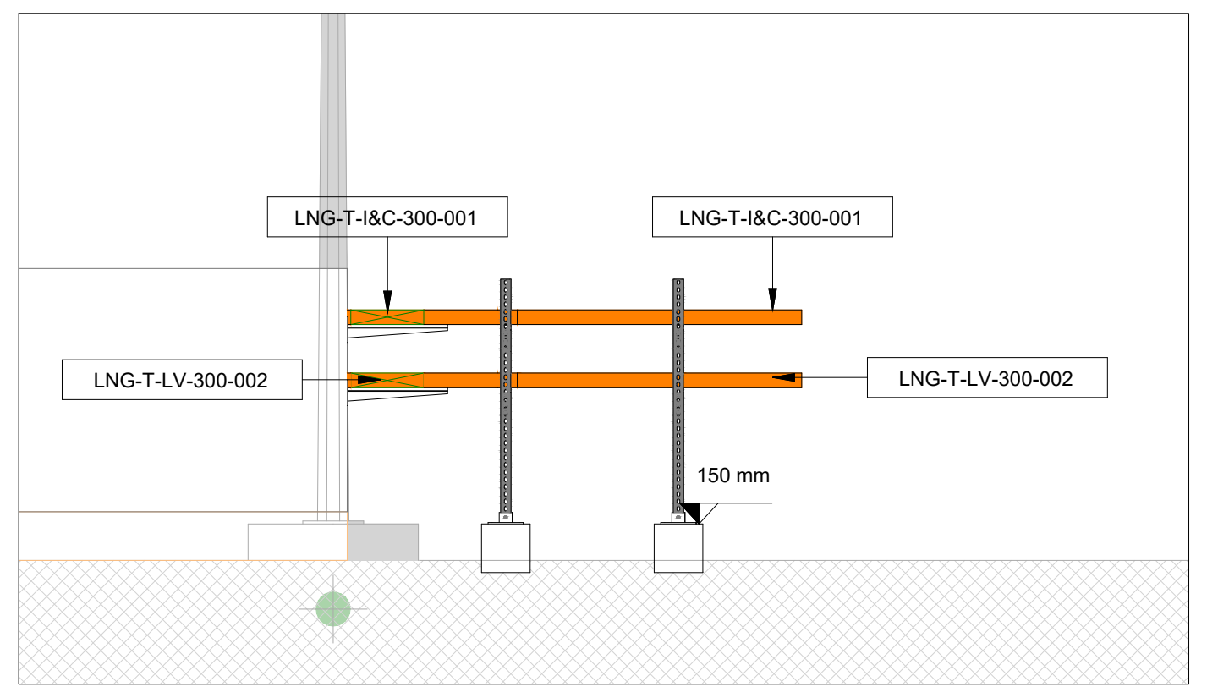
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET:
16
OF:
16

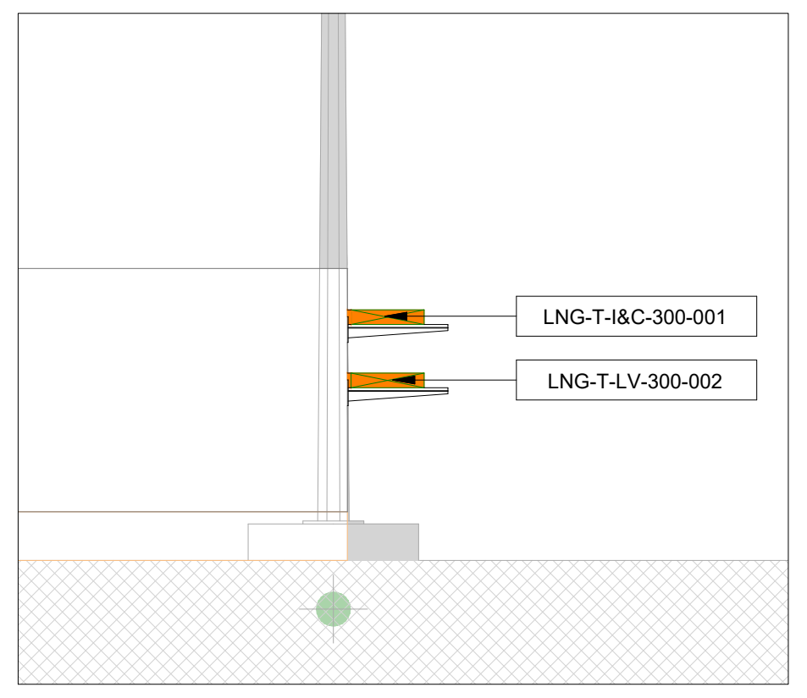
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


5
5
Mark:EM17
Height:1400
Length:1200
Width:1200
LNG-T-LV-300-004
3
4
LNG-T-I&C-300-001
LNG-T-I&C-300-001
4
3

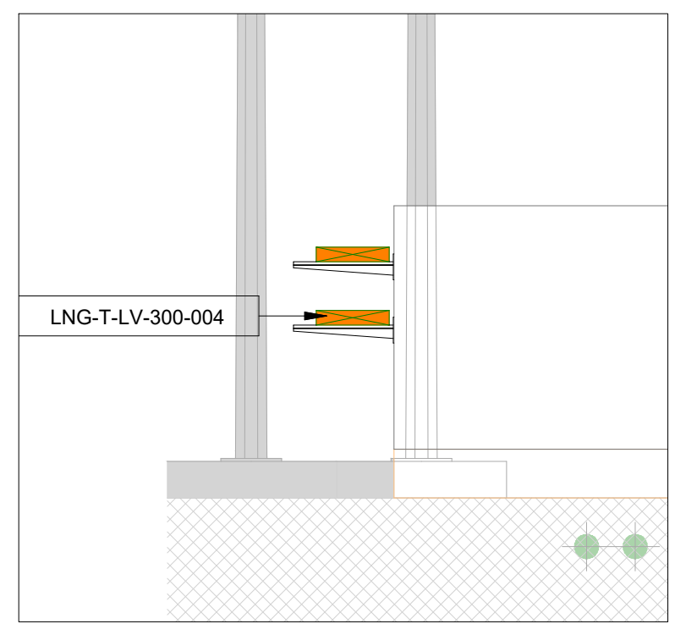
AREA LNG PLAN
SCALE:1/40


LNG-T-I&C-300-001
LNG-T-I&C-300-001
LNG-T-LV-300-002
LNG-T-LV-300-002
150 mm

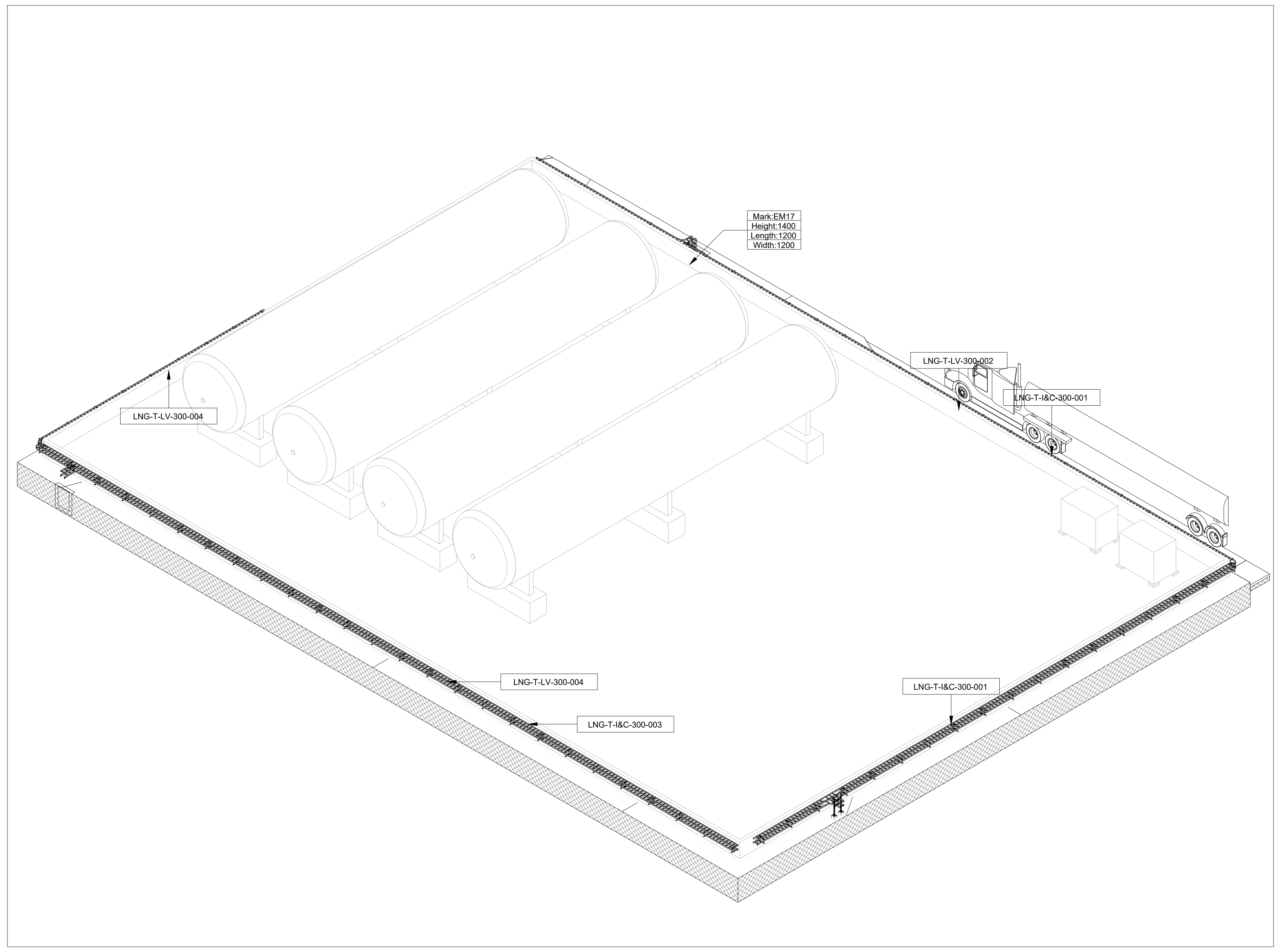
SECTION AA
SCALE:1/50


LNG-T-I&C-300-001
LNG-T-LV-300-002

SECTION BB
SCALE:1/50


LNG-T-LV-300-004

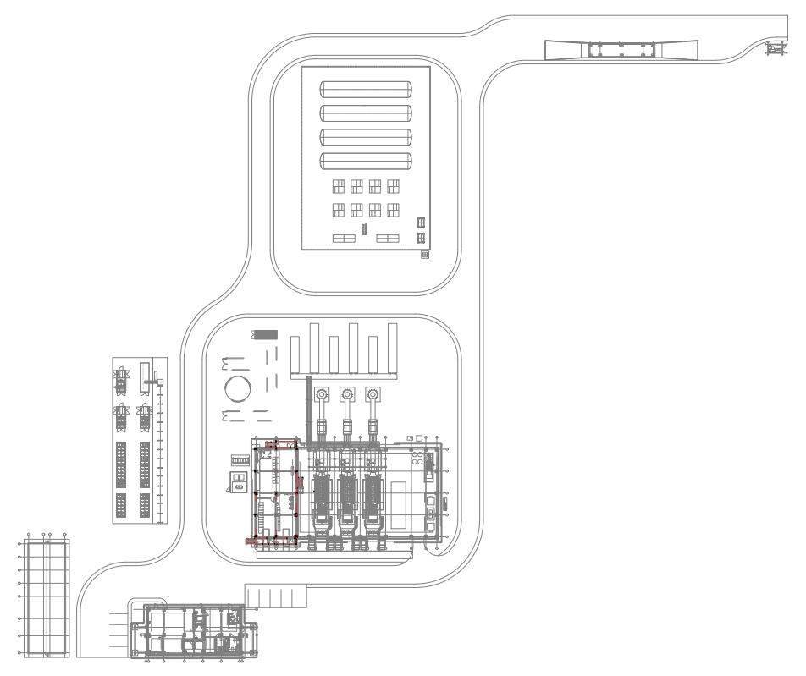
SECTION CC
SCALE:1/50


Mark:EM17
Height:1400
Length:1200
Width:1200
LNG-T-LV-300-002
LNG-T-I&C-300-001
LNG-T-LV-300-004
LNG-T-LV-300-004
LNG-T-I&C-300-003
LNG-T-I&C-300-001

ISOMETRIC VIEW
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-2-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
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5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

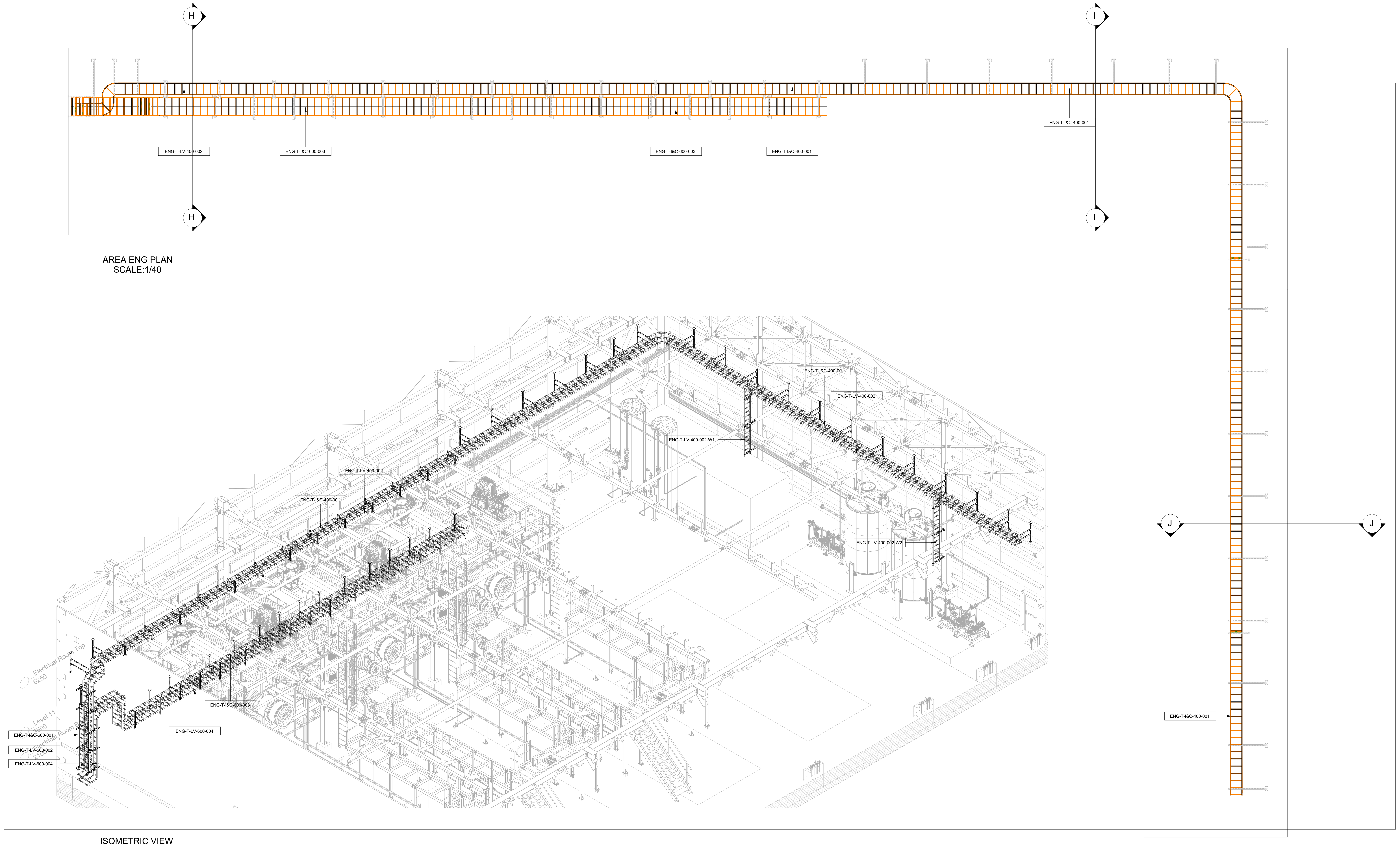
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET: 2
OF: 16

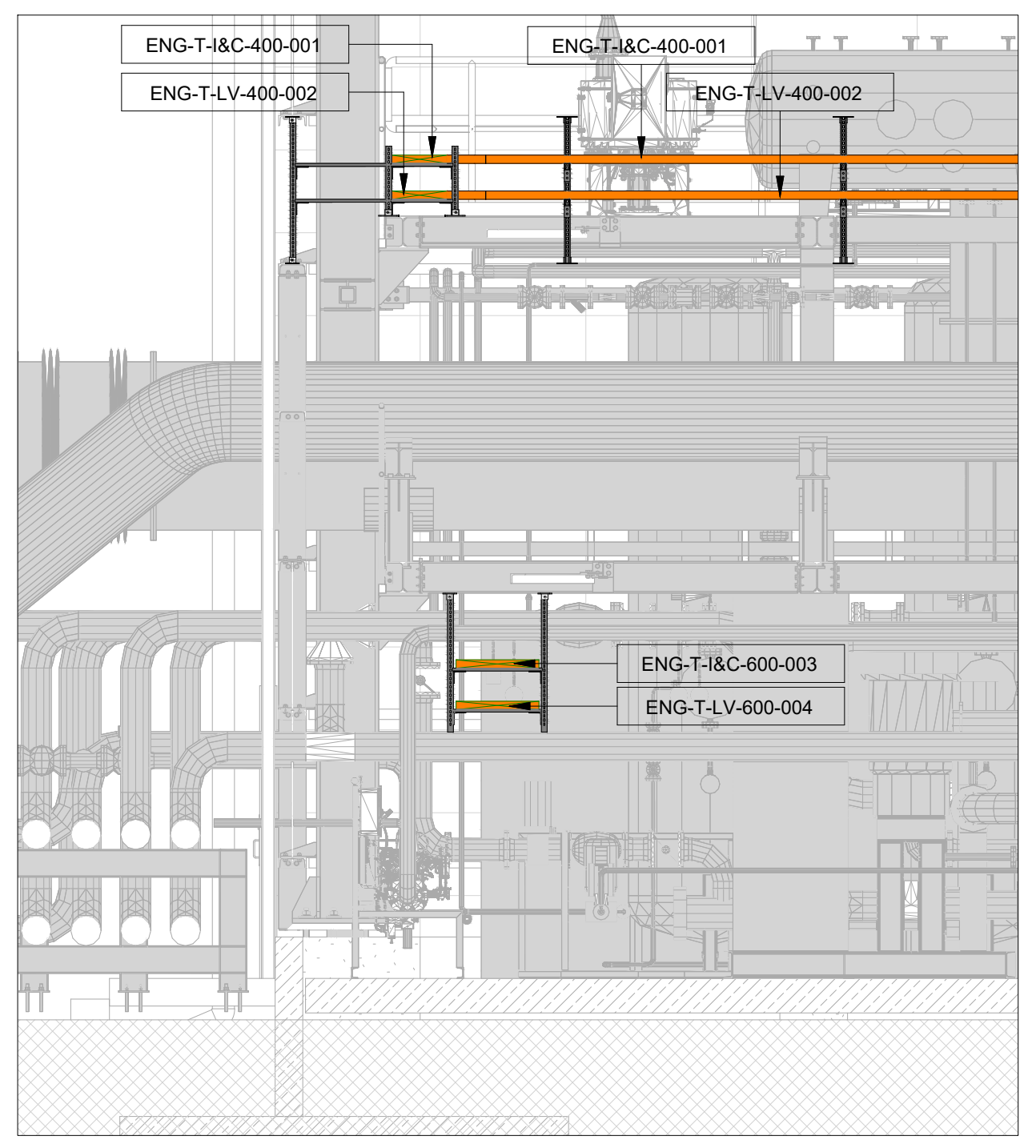
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


H
H
I
I
J
J
ENG-T-LV-400-002
ENG-T-I&C-600-003
ENG-T-I&C-600-003
ENG-T-I&C-400-001
ENG-T-I&C-400-001
ENG-T-I&C-400-001
ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-LV-400-002-W1
ENG-T-LV-400-002
ENG-T-I&C-400-001
ENG-T-LV-400-002-W2
Electrical Room Top
6250
Level 11
3500
Electrical Room Base
2100
ENG-T-I&C-600-003
ENG-T-LV-600-004
ENG-T-I&C-600-001
ENG-T-LV-600-002
ENG-T-LV-600-004

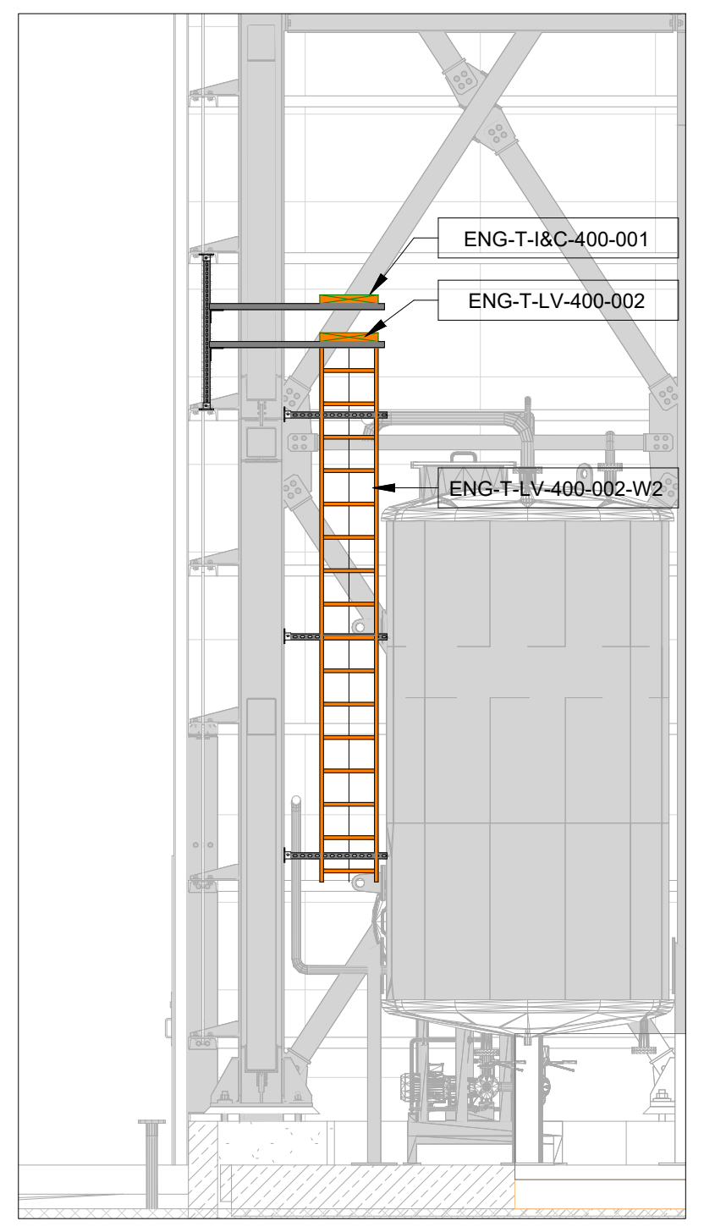
AREA ENG PLAN
SCALE:1/40

ISOMETRIC VIEW
SCALE:1/50

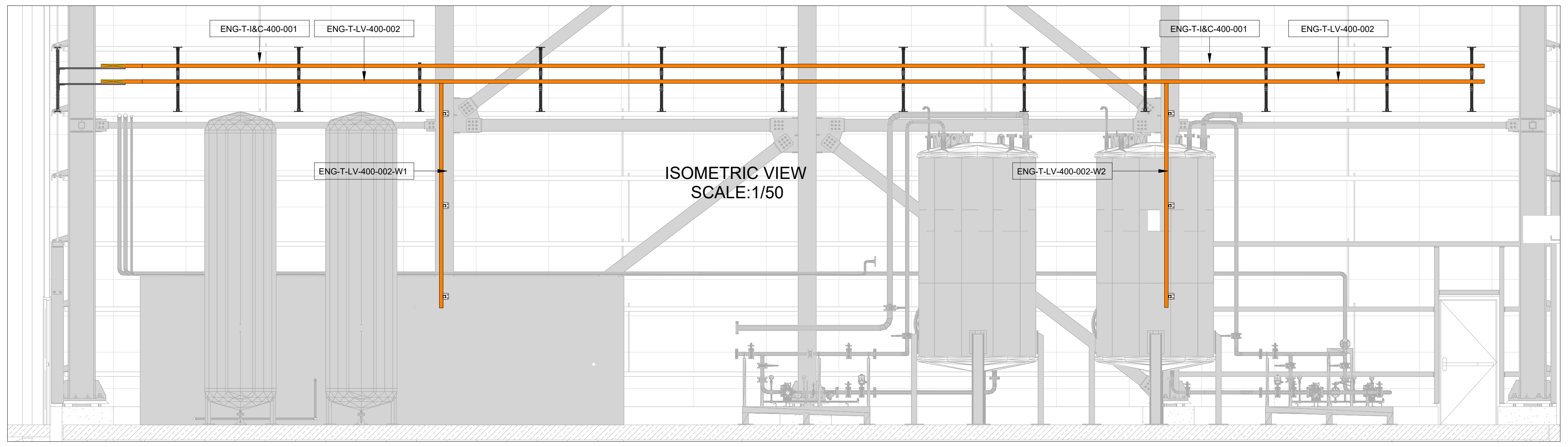
THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-3-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-I&C-600-003
ENG-T-LV-600-004

SECTION H-H
SCALE:1/50

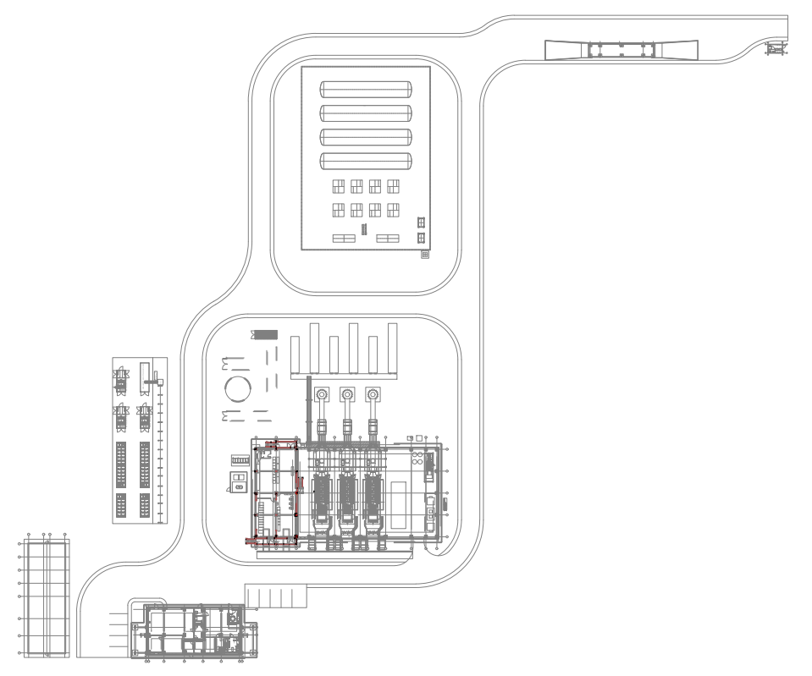

ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-LV-400-002-W2

SECTION J-J
SCALE:1/50


ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-I&C-400-001
ENG-T-LV-400-002
ENG-T-LV-400-002-W1
ENG-T-LV-400-002-W2
ISOMETRIC VIEW
SCALE:1/50

SECTION I-I
SCALE:1/50

KEY-PLAN



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ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
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ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

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iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

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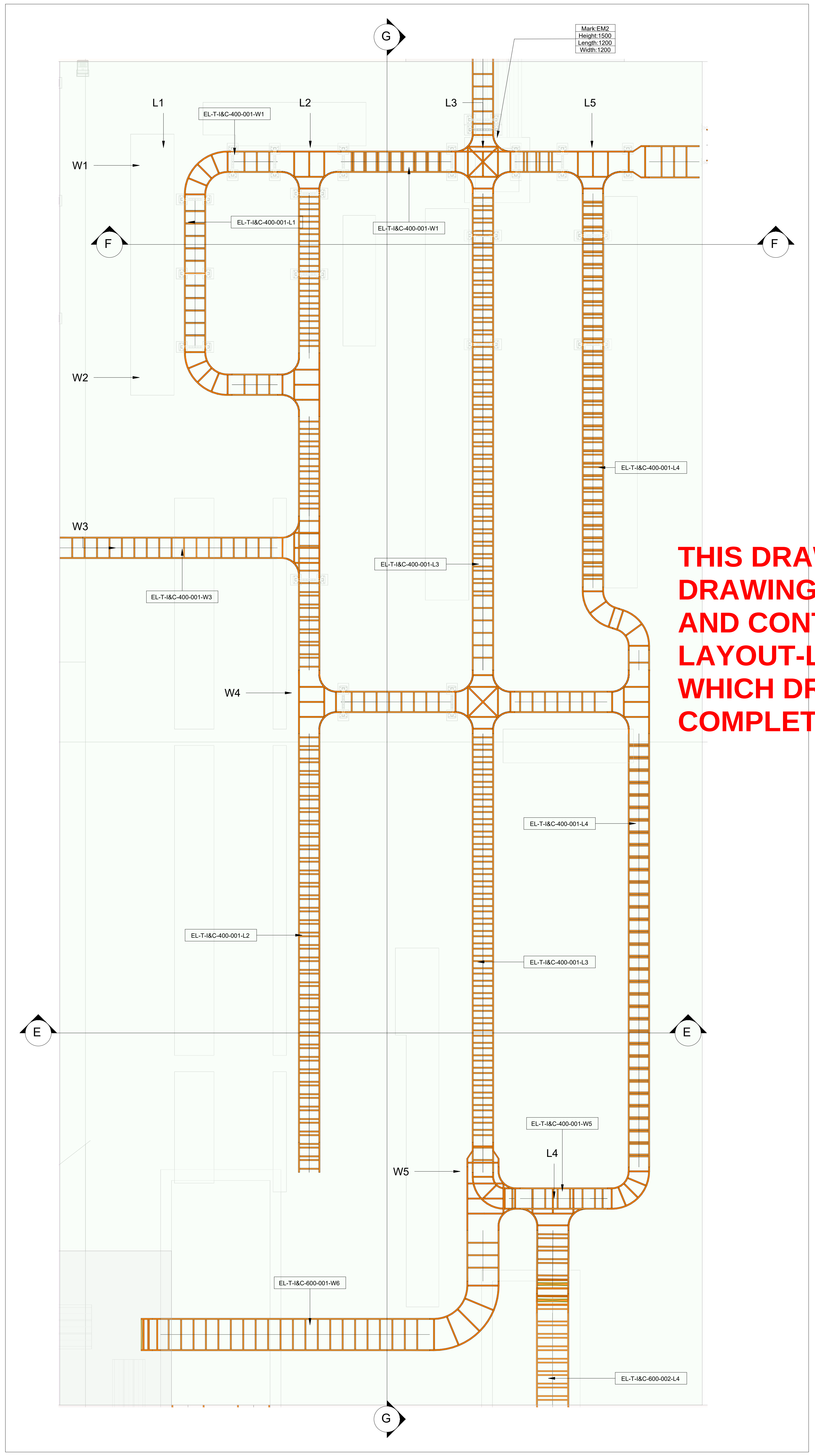
SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

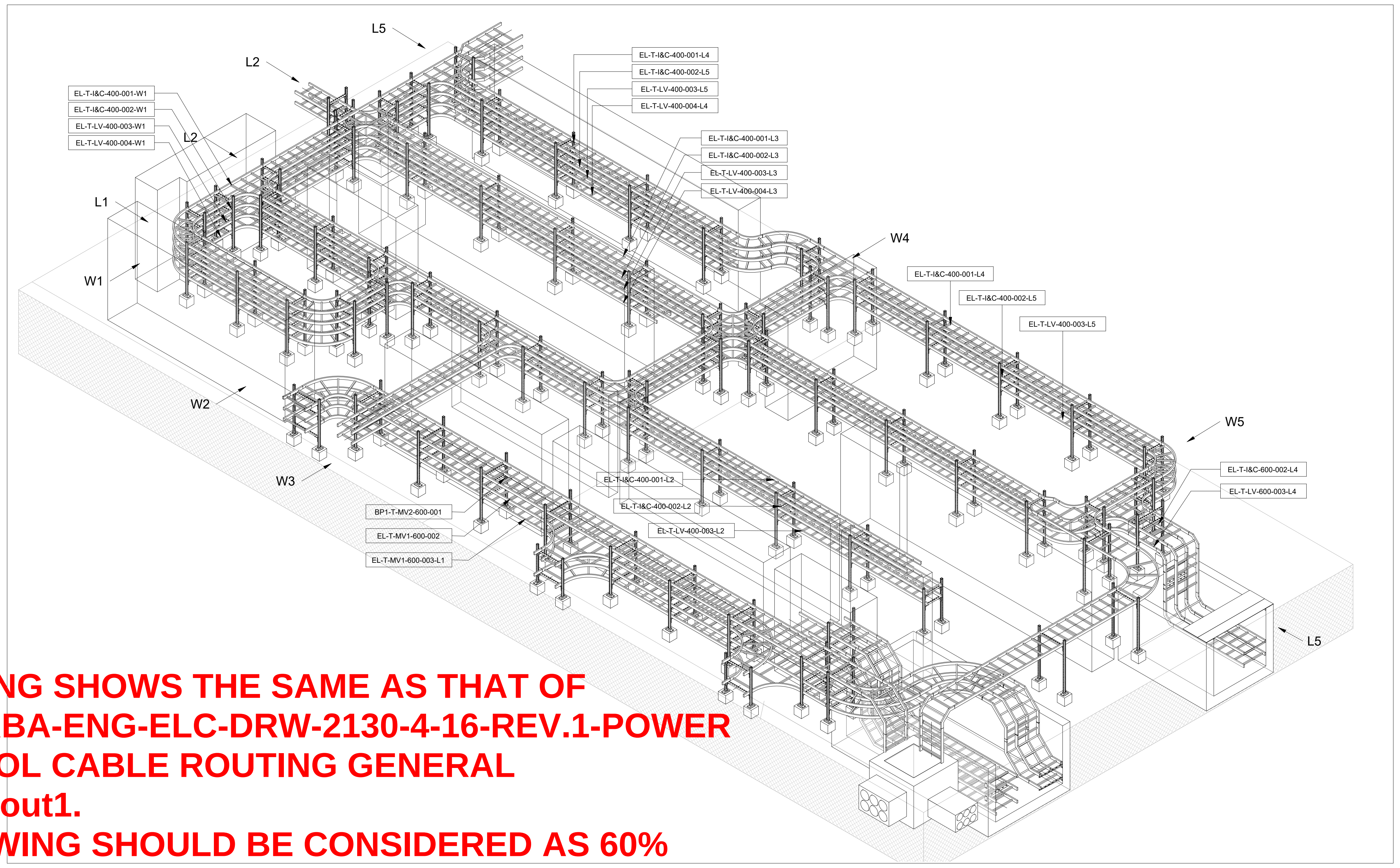
SHEET:
3
OF:
16

DRAWING NAME:
POWER AND CONTROL CABLE ROUTING
GENERAL LAYOUT

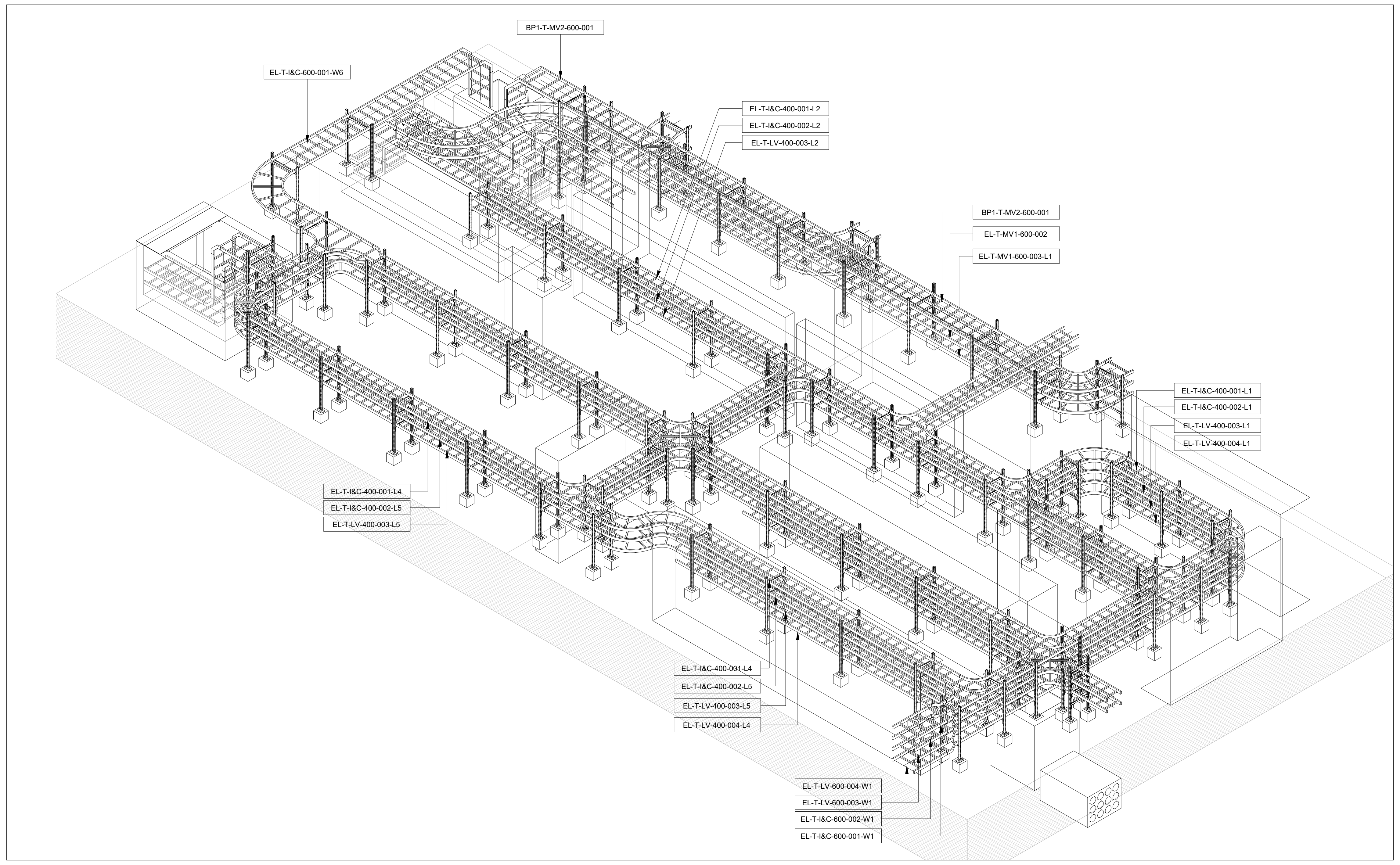

G
Mark:EM2
Height:1500
Length:1200
Width:1200
L1
L2
L3
L5
W1
W2
W3
W4
W5
L4
F
F
E
E
G
EL-T-I&C-400-001-W1
EL-T-I&C-400-001-L1
EL-T-I&C-400-001-W1
EL-T-I&C-400-001-L4
EL-T-I&C-400-001-L3
EL-T-I&C-400-001-W3
EL-T-I&C-400-001-L4
EL-T-I&C-400-001-L2
EL-T-I&C-400-001-L3
EL-T-I&C-400-001-W5
EL-T-I&C-600-001-W6
EL-T-I&C-600-002-L4

AREA EL PLAN
SCALE:1/40

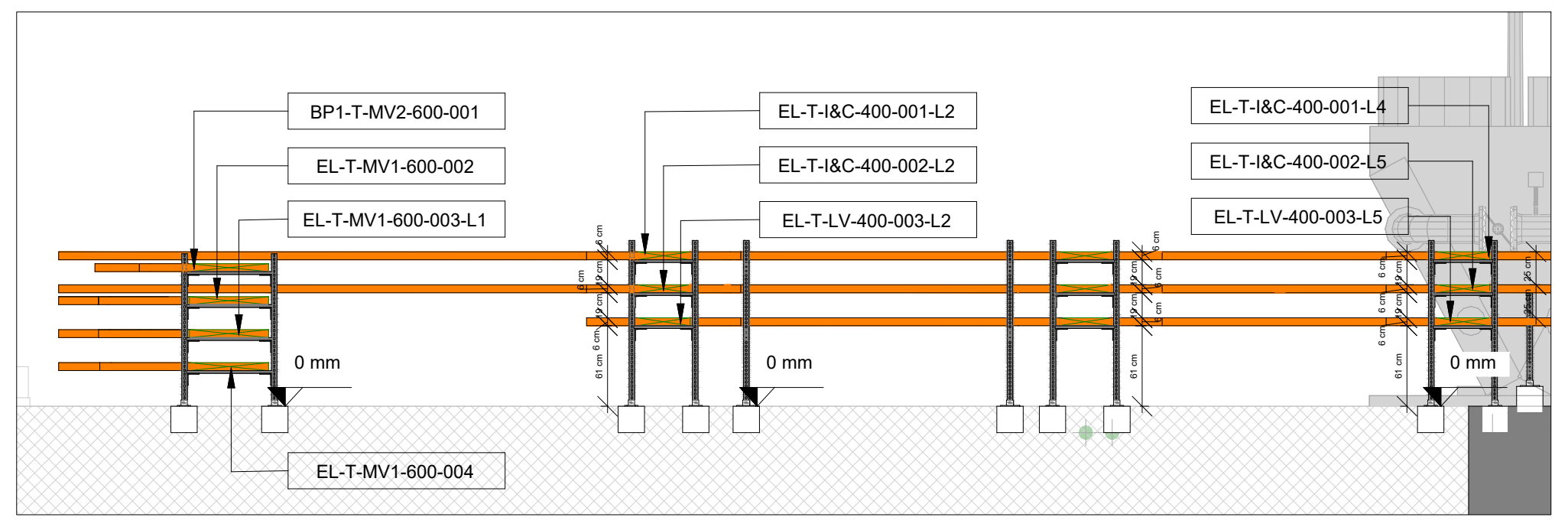
THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-4-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


L5
L2
L2
L1
W1
W2
W3
W4
W5
L5
EL-T-I&C-400-001-W1
EL-T-I&C-400-002-W1
EL-T-LV-400-003-W1
EL-T-LV-400-004-W1
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
EL-T-LV-400-004-L4
EL-T-I&C-400-001-L3
EL-T-I&C-400-002-L3
EL-T-LV-400-003-L3
EL-T-LV-400-004-L3
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
EL-T-I&C-600-002-L4
EL-T-LV-600-003-L4
EL-T-I&C-400-001-L2
EL-T-I&C-400-002-L2
EL-T-LV-400-003-L2
BP1-T-MV2-600-001
EL-T-MV1-600-002
EL-T-MV1-600-003-L1

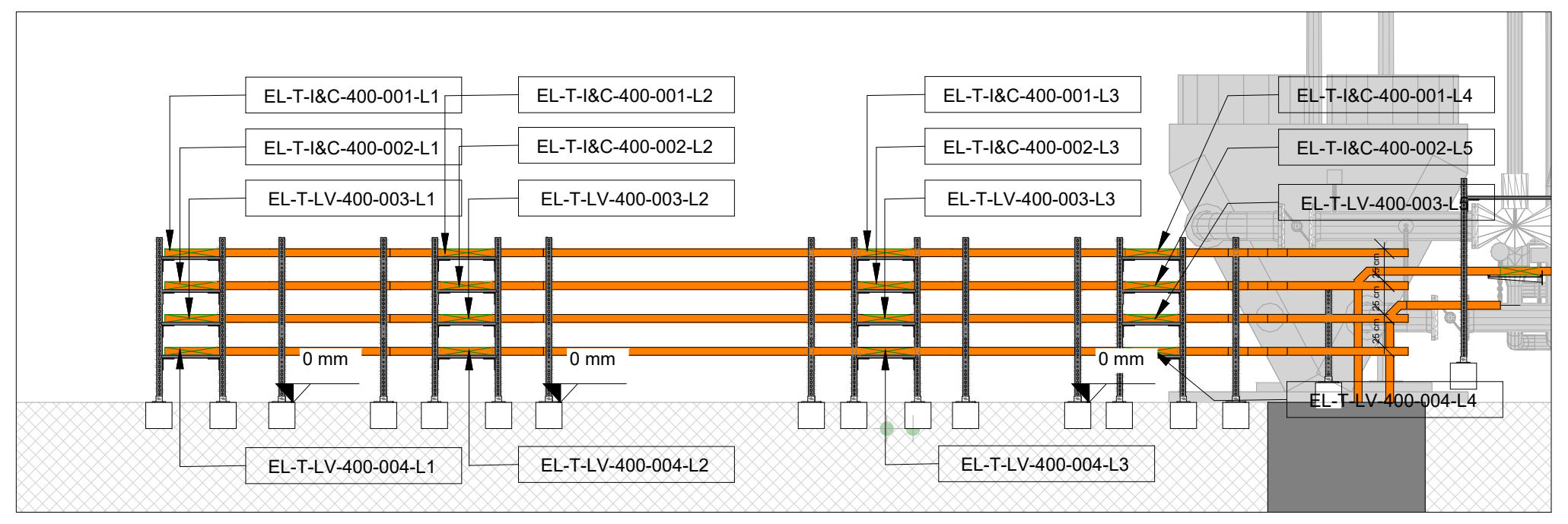
ISOMETRIC VIEW
SCALE:1/50


BP1-T-MV2-600-001
EL-T-I&C-600-001-W6
EL-T-I&C-400-001-L2
EL-T-I&C-400-002-L2
EL-T-LV-400-003-L2
BP1-T-MV2-600-001
EL-T-MV1-600-002
EL-T-MV1-600-003-L1
EL-T-I&C-400-001-L1
EL-T-I&C-400-002-L1
EL-T-LV-400-003-L1
EL-T-LV-400-004-L1
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
EL-T-LV-400-004-L4
EL-T-LV-600-004-W1
EL-T-LV-600-003-W1
EL-T-I&C-600-002-W1
EL-T-I&C-600-001-W1

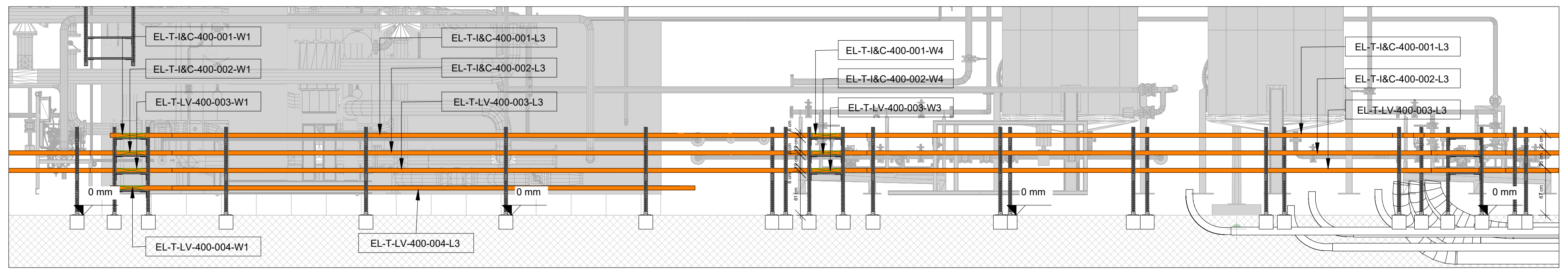
ISOMETRIC VIEW
SCALE:1/50


BP1-T-MV2-600-001
EL-T-MV1-600-002
EL-T-MV1-600-003-L1
EL-T-I&C-400-001-L2
EL-T-I&C-400-002-L2
EL-T-LV-400-003-L2
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
0 mm
0 mm
0 mm
EL-T-MV1-600-004

SECTION E-E
SCALE:1/50

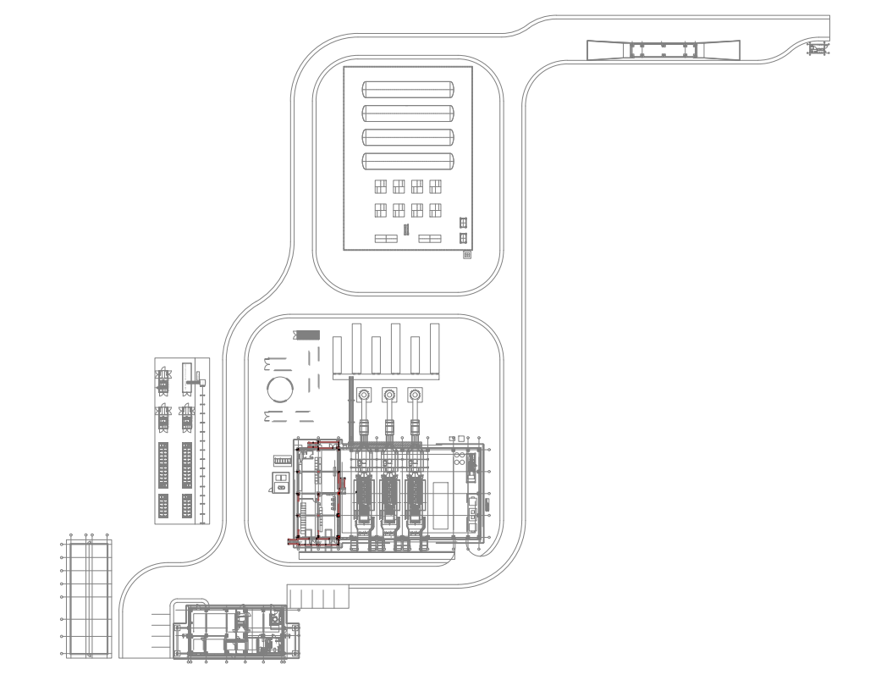

EL-T-I&C-400-001-L1
EL-T-I&C-400-002-L1
EL-T-LV-400-003-L1
EL-T-I&C-400-001-L2
EL-T-I&C-400-002-L2
EL-T-LV-400-003-L2
EL-T-I&C-400-001-L3
EL-T-I&C-400-002-L3
EL-T-LV-400-003-L3
EL-T-I&C-400-001-L4
EL-T-I&C-400-002-L5
EL-T-LV-400-003-L5
0 mm
0 mm
0 mm
EL-T-LV-400-004-L1
EL-T-LV-400-004-L2
EL-T-LV-400-004-L3
EL-T-LV-400-004-L4

SECTION F-F
SCALE:1/50


EL-T-I&C-400-001-W1
EL-T-I&C-400-002-W1
EL-T-LV-400-003-W1
EL-T-I&C-400-001-L3
EL-T-I&C-400-002-L3
EL-T-LV-400-003-L3
EL-T-I&C-400-001-W4
EL-T-I&C-400-002-W4
EL-T-LV-400-003-W3
EL-T-I&C-400-001-L3
EL-T-I&C-400-002-L3
EL-T-LV-400-003-L3
0 mm
0 mm
0 mm
0 mm
EL-T-LV-400-004-W1
EL-T-LV-400-004-L3

SECTION G-G
SCALE:1/50

KEY-PLAN



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ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

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ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER

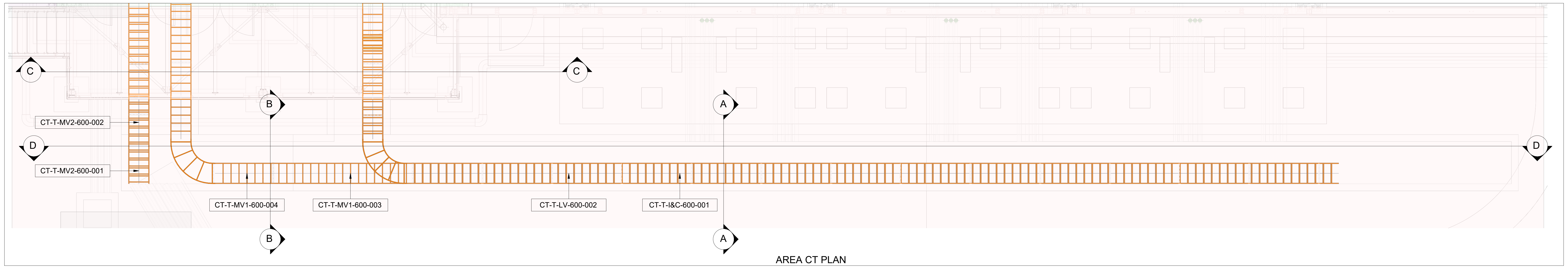
SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

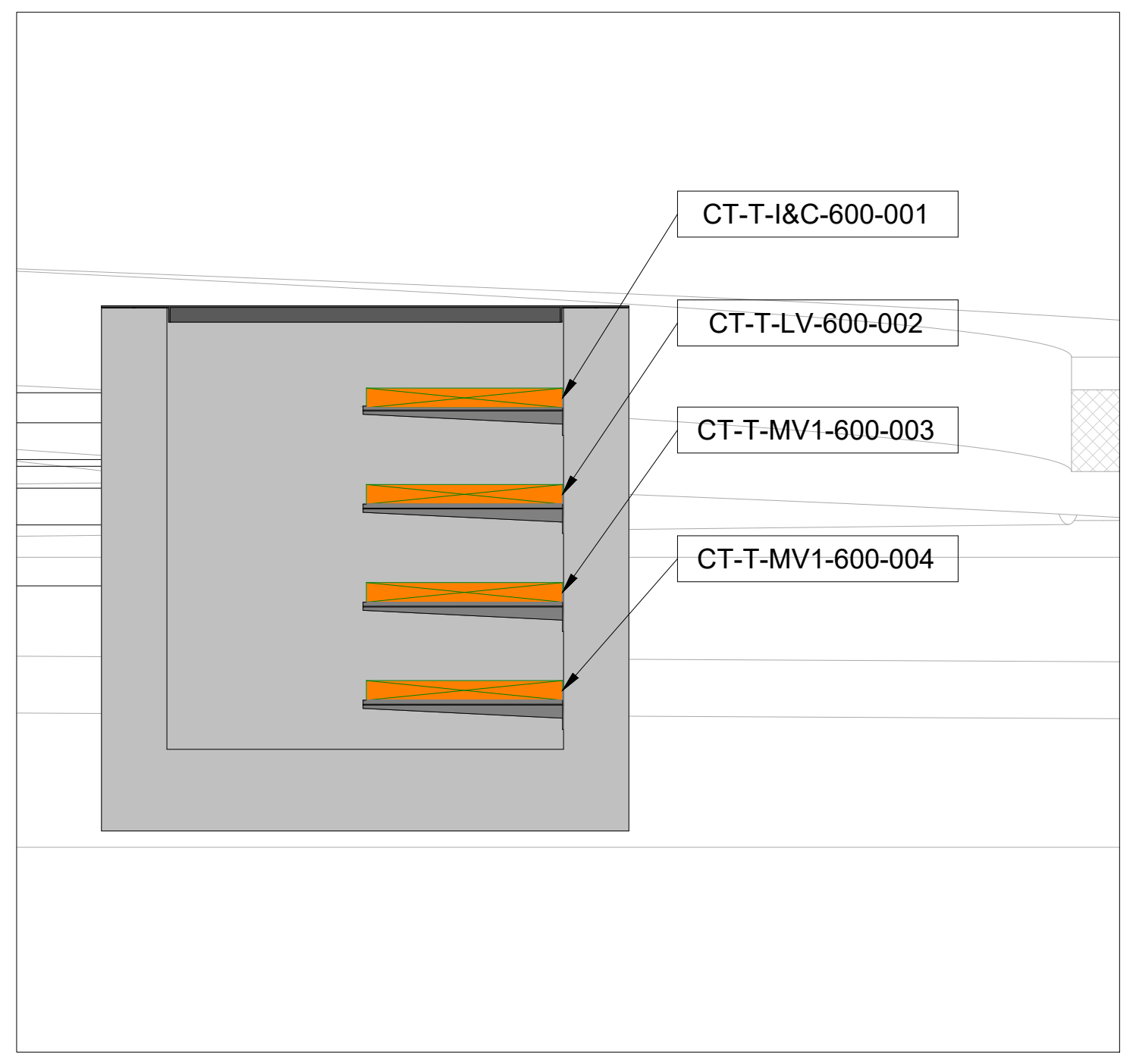
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

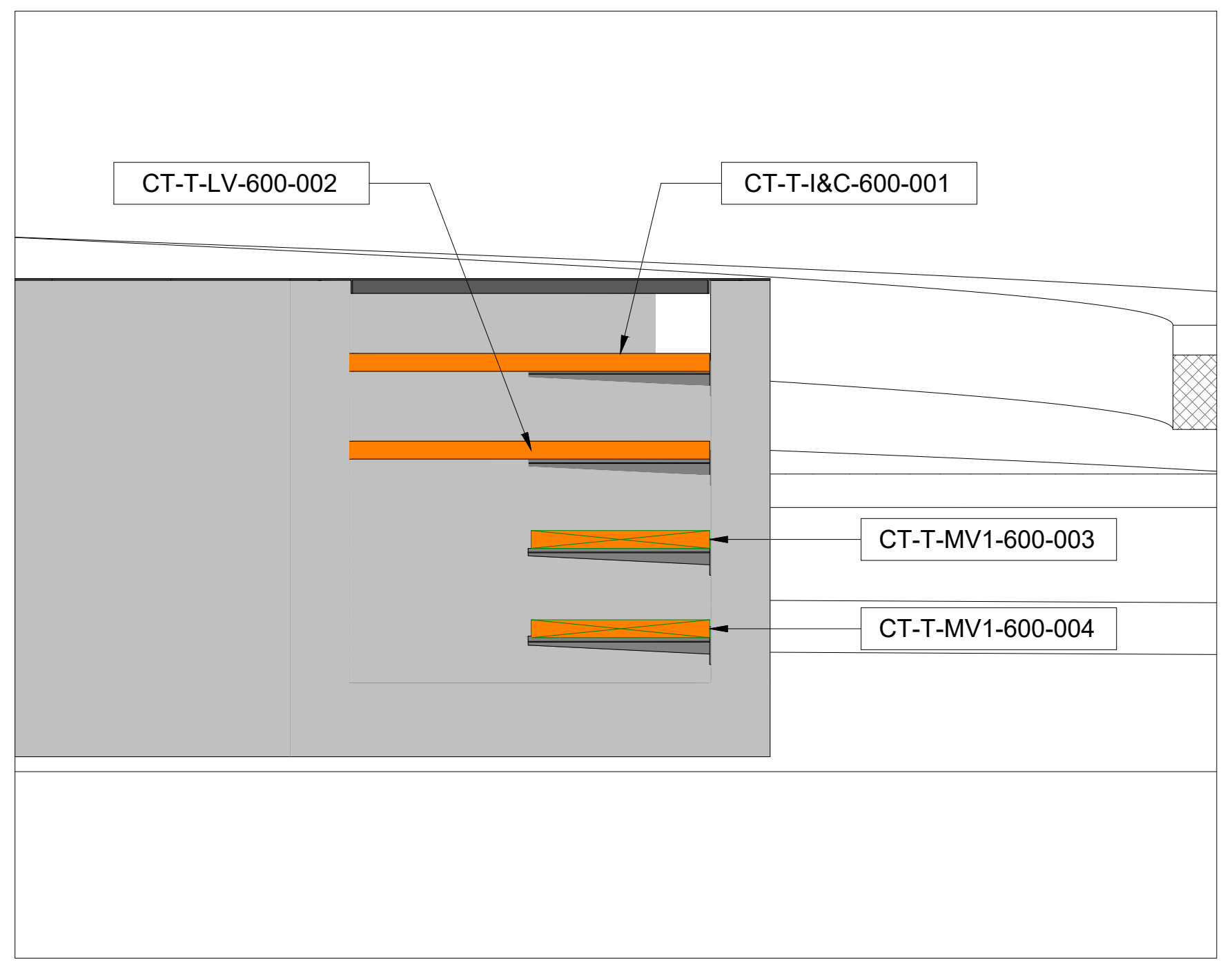
DRAWING NUMBER: ABA-ENG-ELC-DRW-2130
SHEET: 4
OF: 9
DRAWING NAME: POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


C
C
B
A
D
D
CT-T-MV2-600-002
CT-T-MV2-600-001
CT-T-MV1-600-004
CT-T-MV1-600-003
CT-T-LV-600-002
CT-T-I&C-600-001
B
A

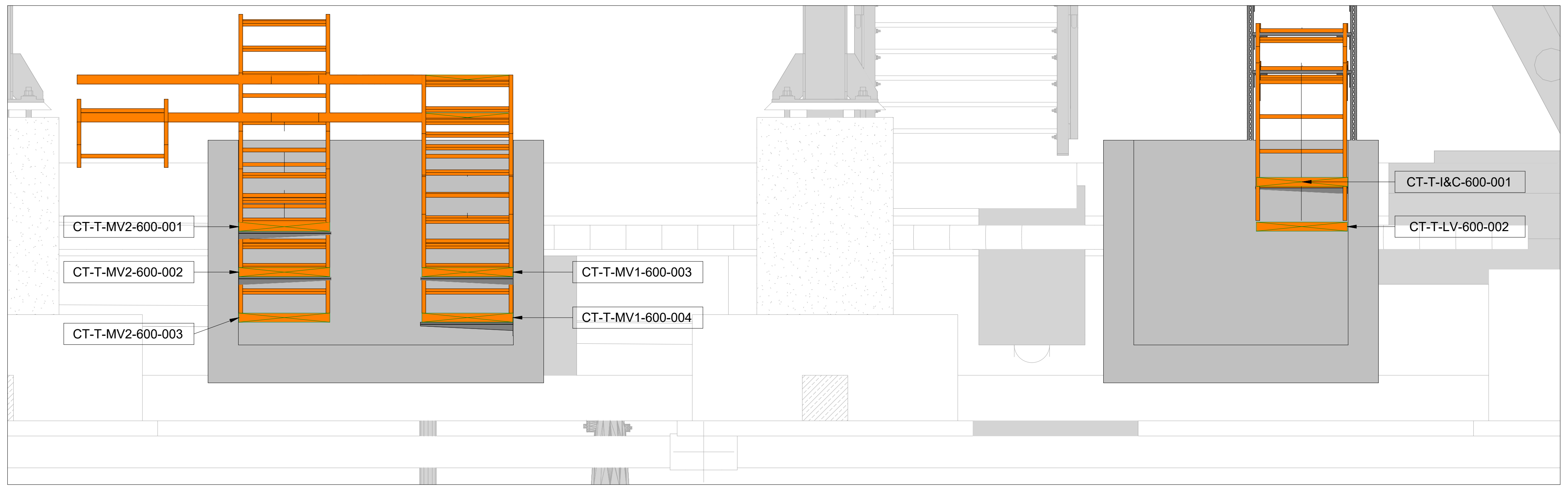
AREA CT PLAN
SCALE:1/20


CT-T-I&C-600-001
CT-T-LV-600-002
CT-T-MV1-600-003
CT-T-MV1-600-004

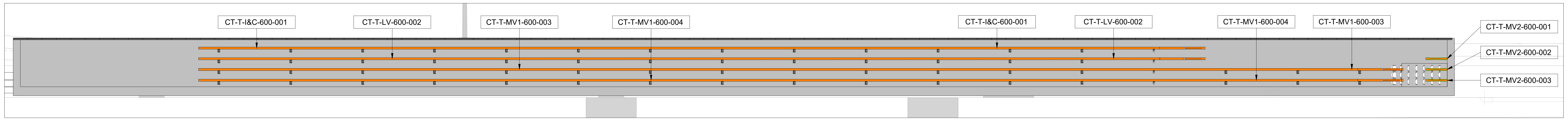
SECTION A-A
SCALE:1/20


CT-T-LV-600-002
CT-T-I&C-600-001
CT-T-MV1-600-003
CT-T-MV1-600-004

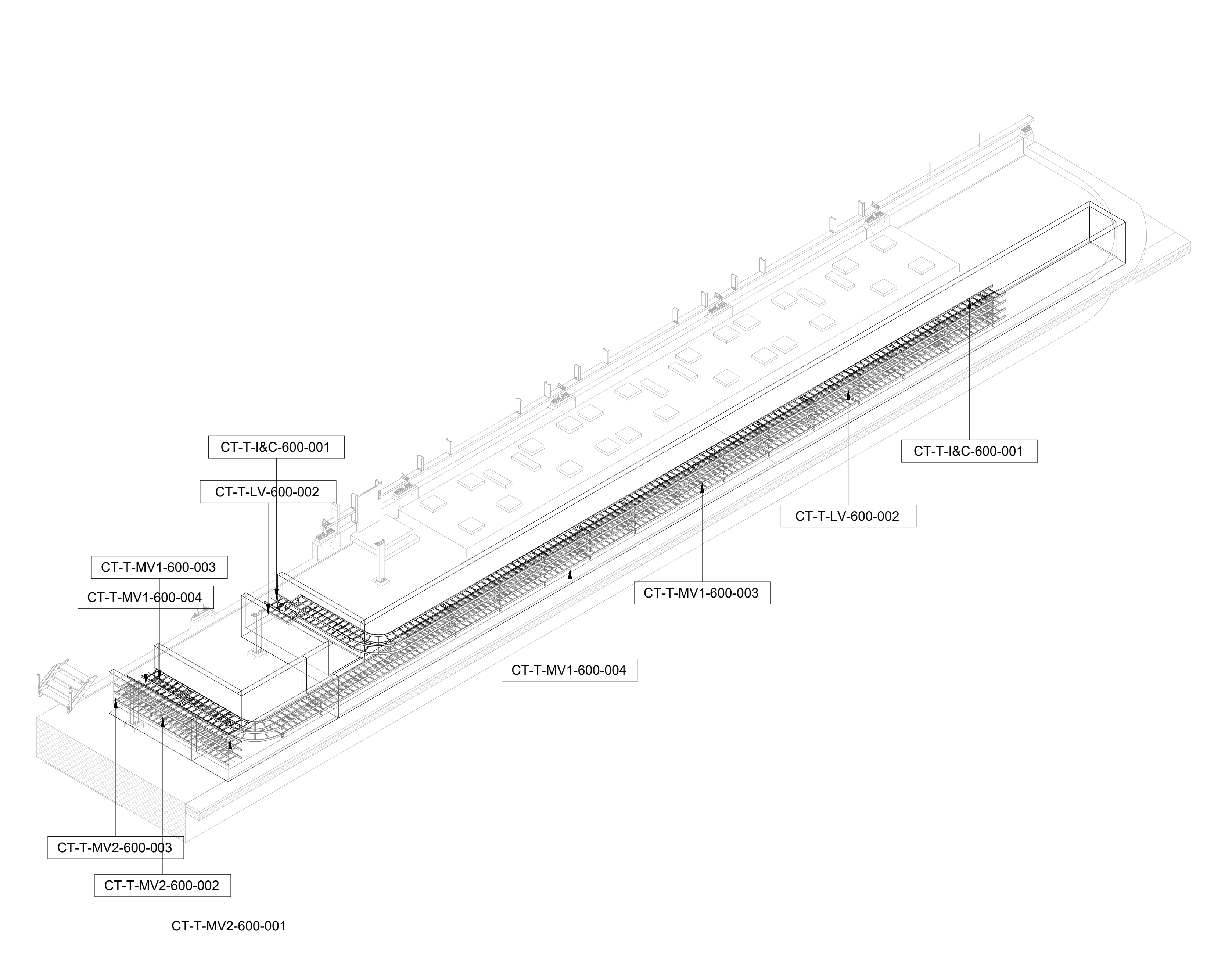
SECTION B-B
SCALE:1/20


CT-T-MV2-600-001
CT-T-MV2-600-002
CT-T-MV2-600-003
CT-T-MV1-600-003
CT-T-MV1-600-004
CT-T-I&C-600-001
CT-T-LV-600-002

SECTION C-C
SCALE:1/20


CT-T-I&C-600-001
CT-T-LV-600-002
CT-T-MV1-600-003
CT-T-MV1-600-004
CT-T-I&C-600-001
CT-T-LV-600-002
CT-T-MV1-600-004
CT-T-MV1-600-003
CT-T-MV2-600-001
CT-T-MV2-600-002
CT-T-MV2-600-003

SECTION D-D
SCALE:1/50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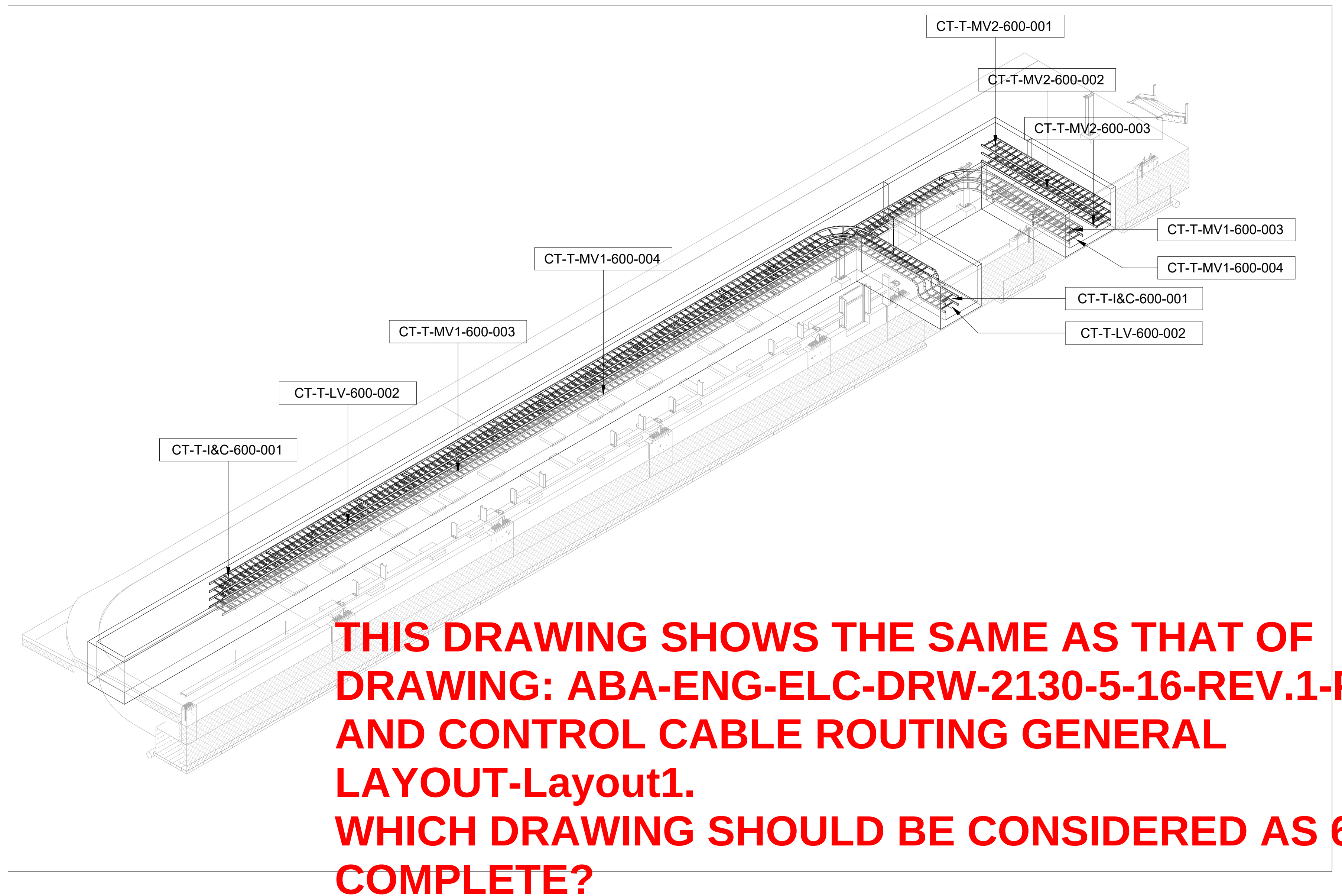
CT-T-LV-600-002
CT-T-I&C-600-001
CT-T-LV-600-002
CT-T-MV1-600-003
CT-T-MV1-600-004
CT-T-MV1-600-003
CT-T-MV1-600-004
CT-T-MV2-600-003
CT-T-MV2-600-002
CT-T-MV2-600-001

ISOMETRIC VIEW
SCALE:1/100


CT-T-MV2-600-001
CT-T-MV2-600-002
CT-T-MV2-600-003
CT-T-MV1-600-003
CT-T-MV1-600-004
CT-T-I&C-600-001
CT-T-LV-600-002
CT-T-MV1-600-004
CT-T-MV1-600-003
CT-T-LV-600-002
CT-T-I&C-600-001

ISOMETRIC VIEW
SCALE:1/100

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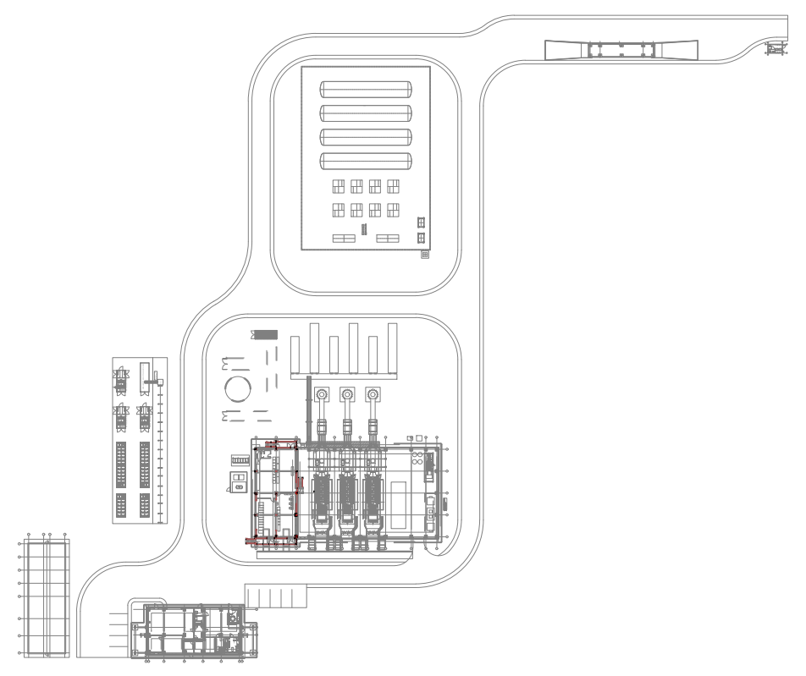
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

KEY-PLAN



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RELATED DRAWINGS

LEGEND

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DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
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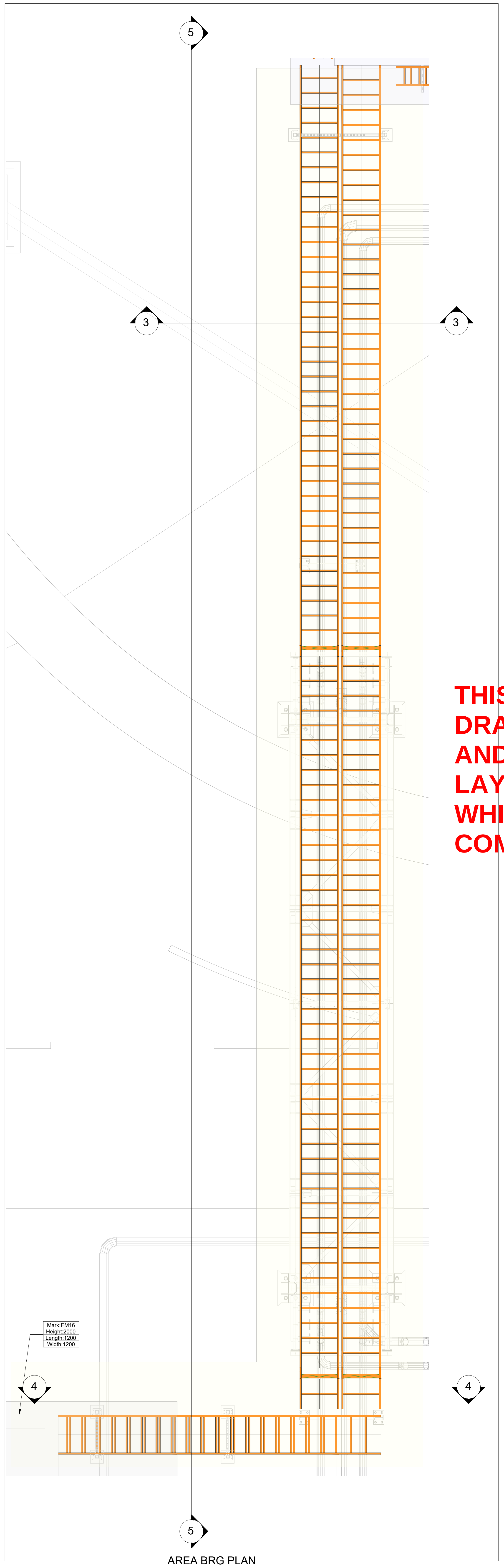
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

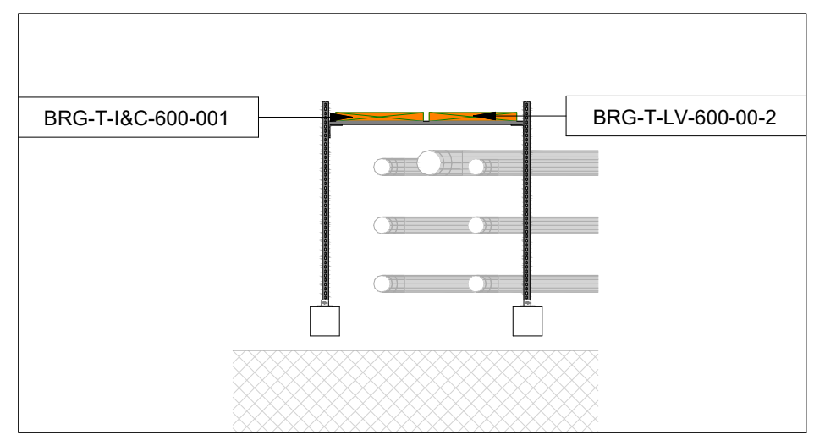
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET: 5
OF: 16

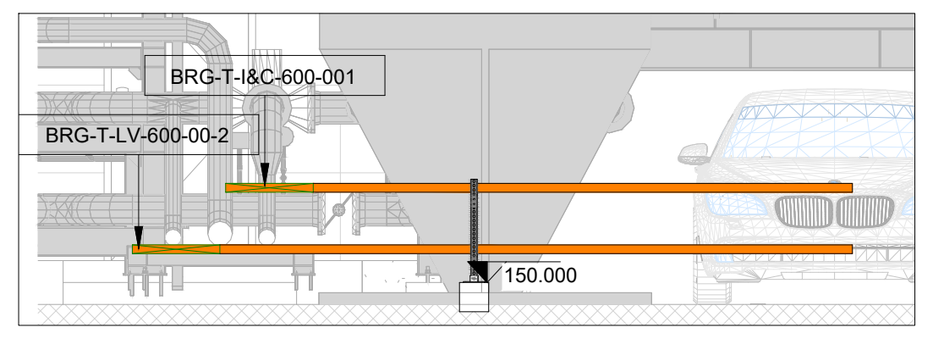
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT


5
3
3
Mark:EM16
Height:2000
Length:1200
Width:1200
4
4
5

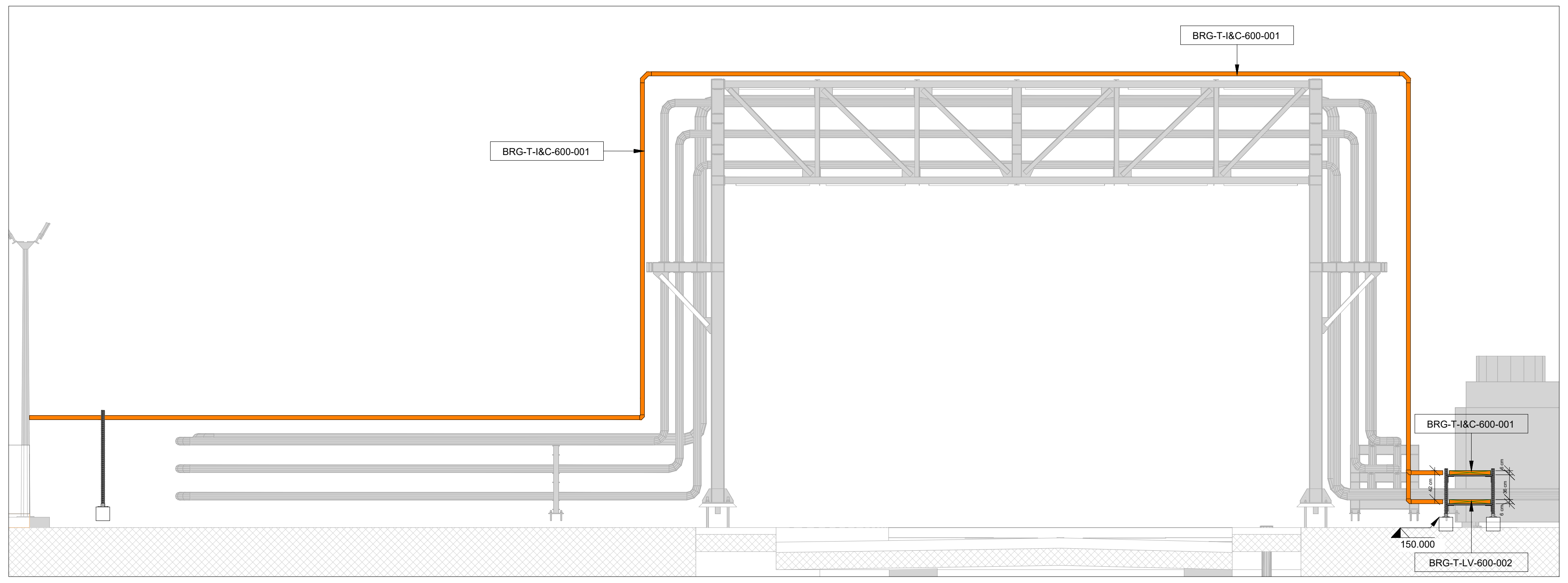
AREA BRG PLAN
SCALE:1/40


BRG-T-I&C-600-001
BRG-T-LV-600-00-2

SECTION V-V
SCALE:1/50

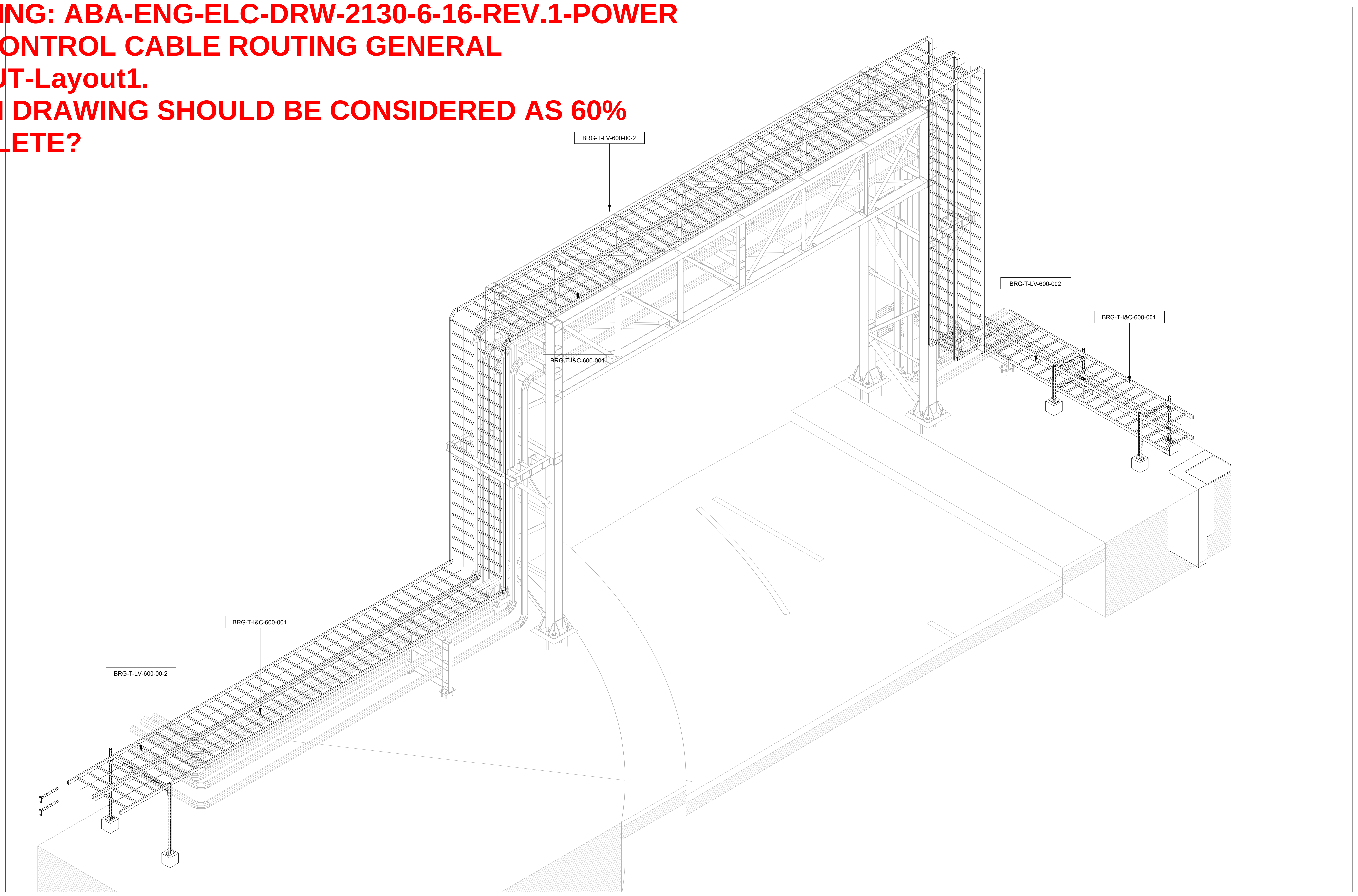

BRG-T-I&C-600-001
BRG-T-LV-600-00-2
150.000

SECTION Y-Y
SCALE:1/50


BRG-T-I&C-600-001
BRG-T-I&C-600-001
BRG-T-I&C-600-001
150.000
BRG-T-LV-600-002

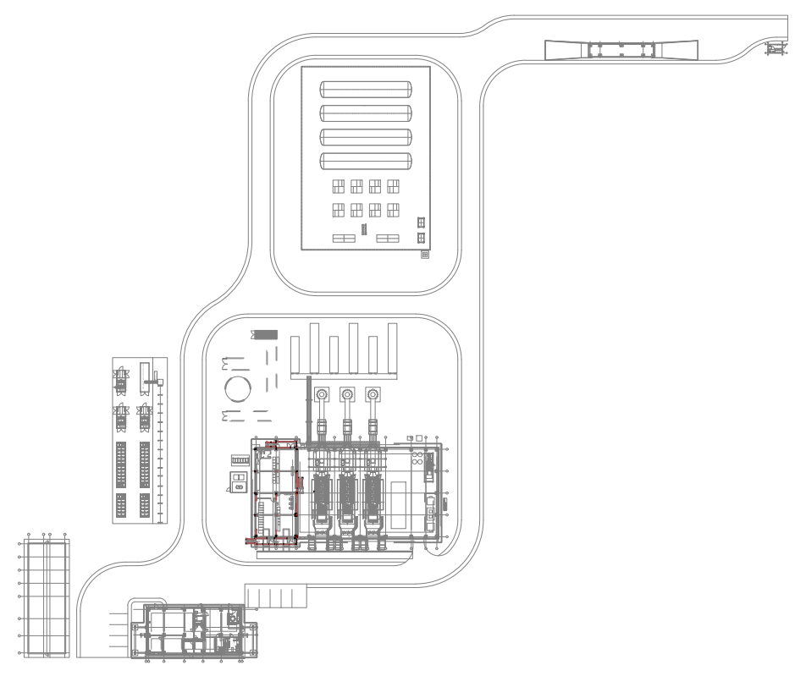
SECTION Z-Z
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-6-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


BRG-T-LV-600-00-2
BRG-T-LV-600-002
BRG-T-I&C-600-001
BRG-T-I&C-600-001
BRG-T-I&C-600-001
BRG-T-LV-600-00-2

ISOMETRIC VIEW
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M, UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
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5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM THE DRAWING

NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

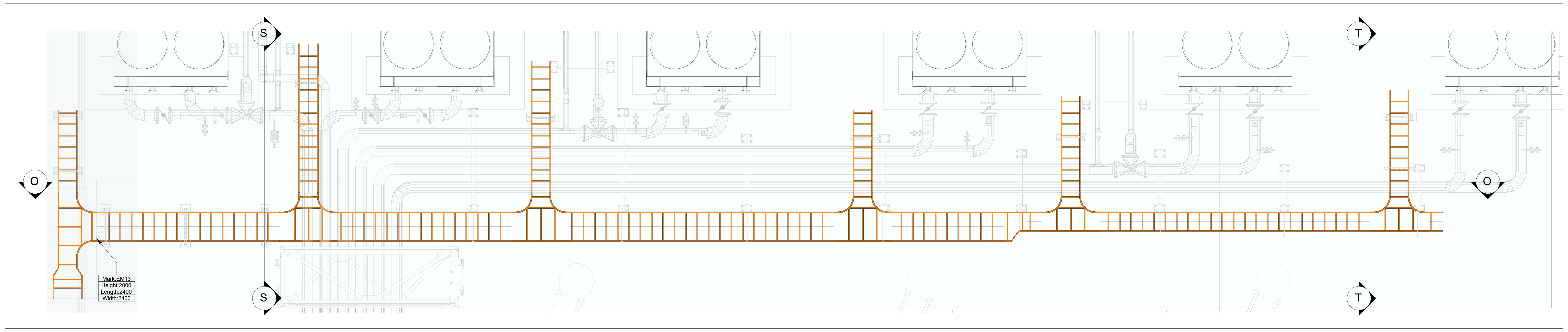
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

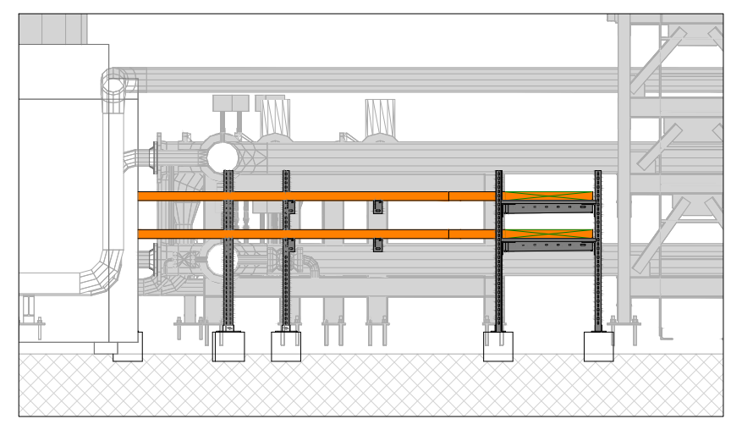
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET: 6
OF: 16

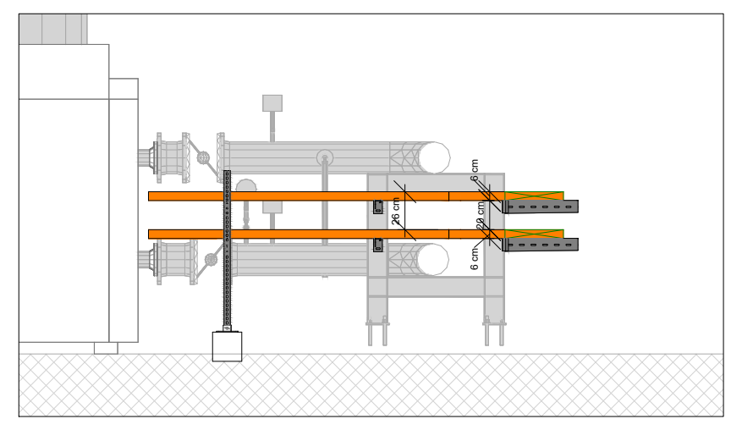
DRAWING NAME:
POWER AND CONTROL CABLE ROUTING
GENERAL LAYOUT


S
S
T
T
O
O
Mark:EM13
Height:2000
Length:2400
Width:2400

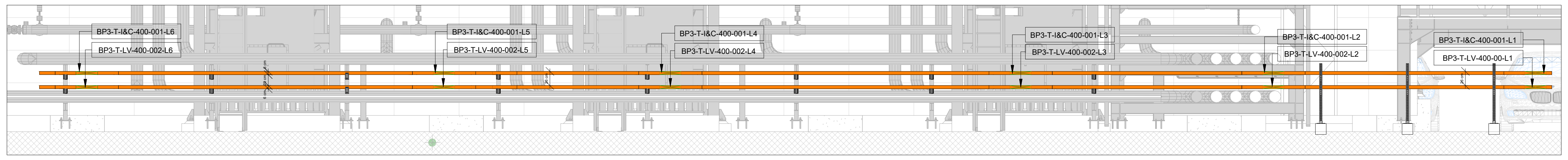
AREA BP3 PLAN
SCALE:1/40



SECTION S-S
SCALE:1/50

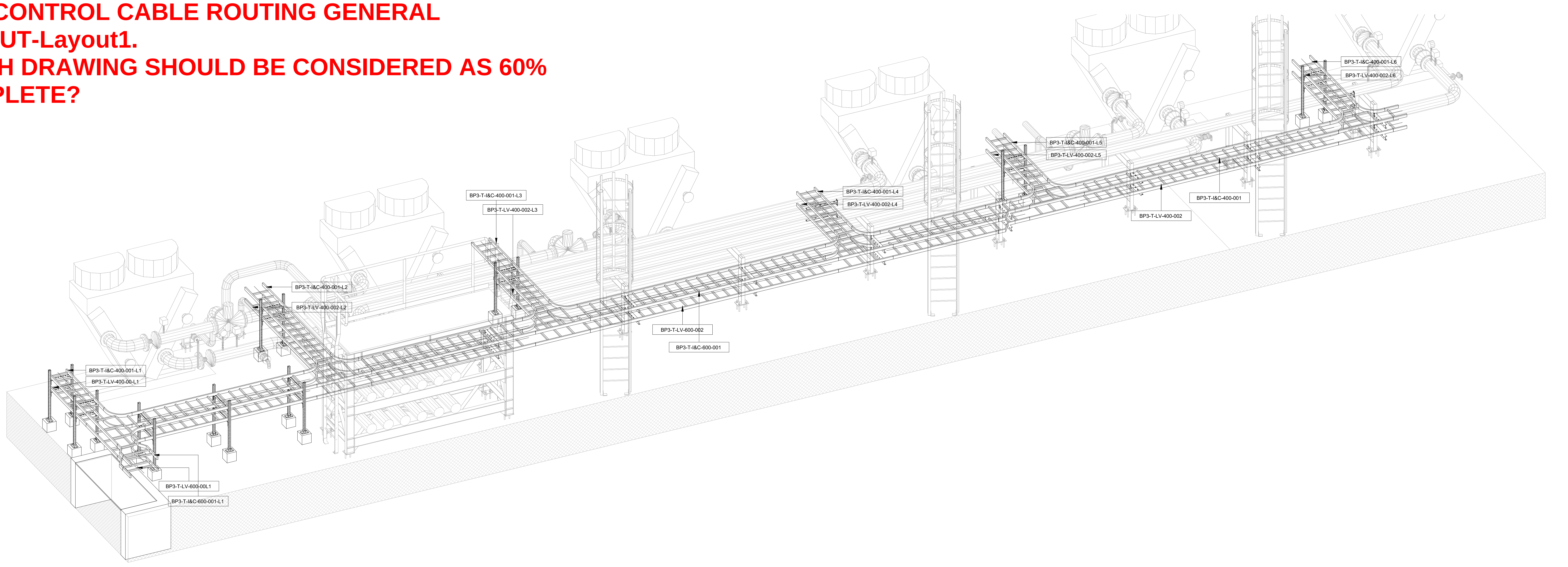


SECTION T-T
SCALE:1/50


BP3-T-I&C-400-001-L6
BP3-T-LV-400-002-L6
BP3-T-I&C-400-001-L5
BP3-T-LV-400-002-L5
BP3-T-I&C-400-001-L4
BP3-T-LV-400-002-L4
BP3-T-I&C-400-001-L3
BP3-T-LV-400-002-L3
BP3-T-I&C-400-001-L2
BP3-T-LV-400-002-L2
BP3-T-I&C-400-001-L1
BP3-T-LV-400-00-L1

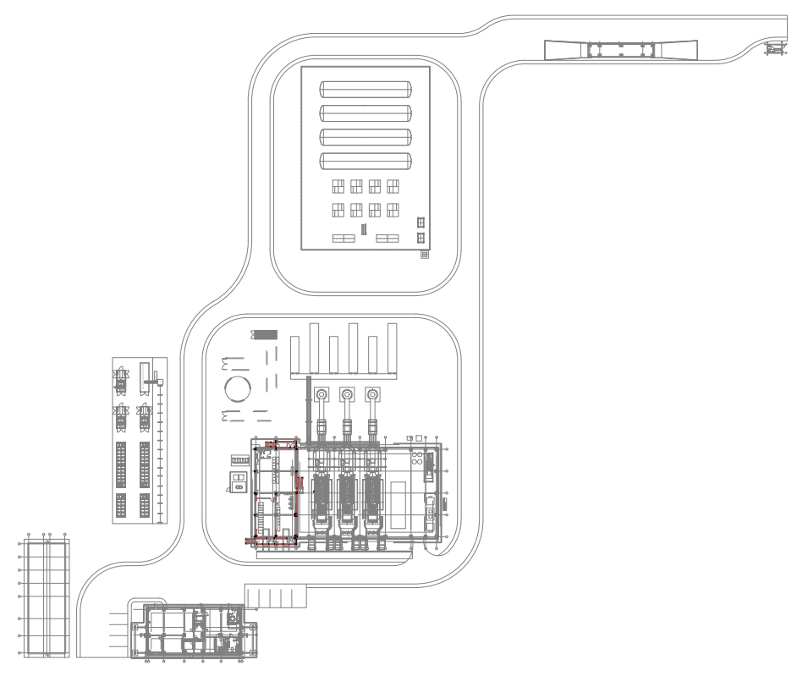
SECTION O-O
SCALE:1/50

THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-7-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


BP3-T-I&C-400-001-L6
BP3-T-LV-400-002-L6
BP3-T-I&C-400-001-L5
BP3-T-LV-400-002-L5
BP3-T-I&C-400-001-L4
BP3-T-LV-400-002-L4
BP3-T-I&C-400-001
BP3-T-LV-400-002
BP3-T-I&C-400-001-L3
BP3-T-LV-400-002-L3
BP3-T-LV-600-002
BP3-T-I&C-600-001
BP3-T-I&C-400-001-L2
BP3-T-LV-400-002-L2
BP3-T-I&C-400-001-L1
BP3-T-LV-400-00-L1
BP3-T-LV-600-00L1
BP3-T-I&C-600-001-L1

ISOMETRIC VIEW
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

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NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

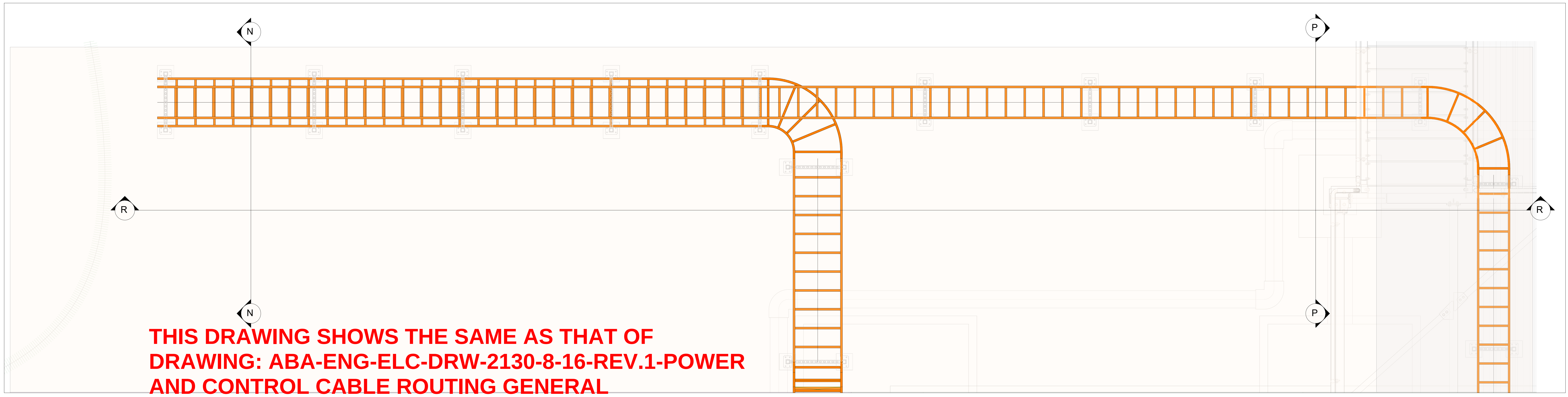
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

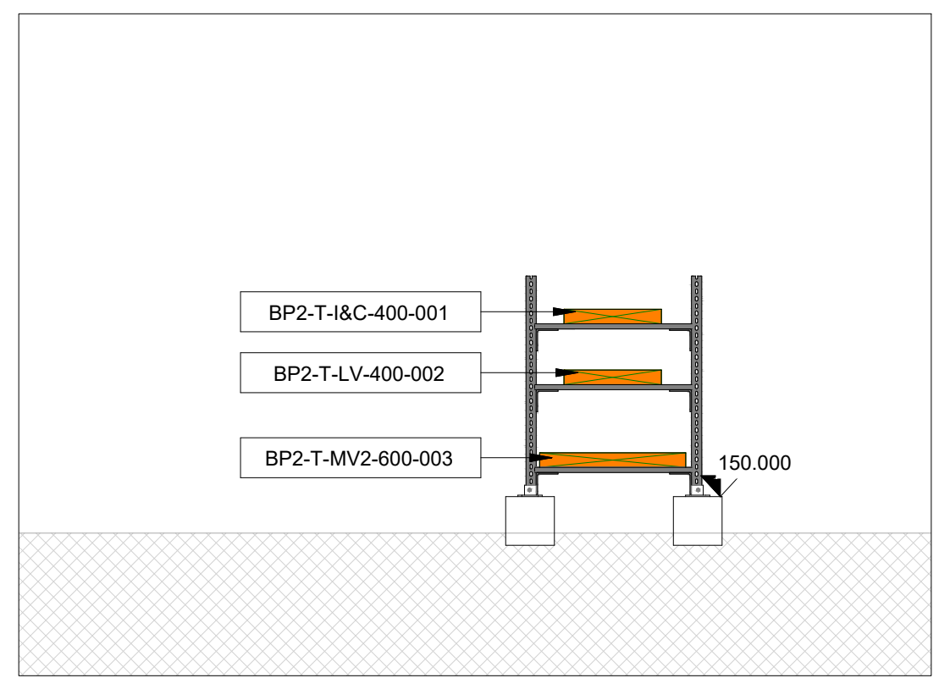
SHEET: 7
OF: 16

DRAWING NAME:
POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT

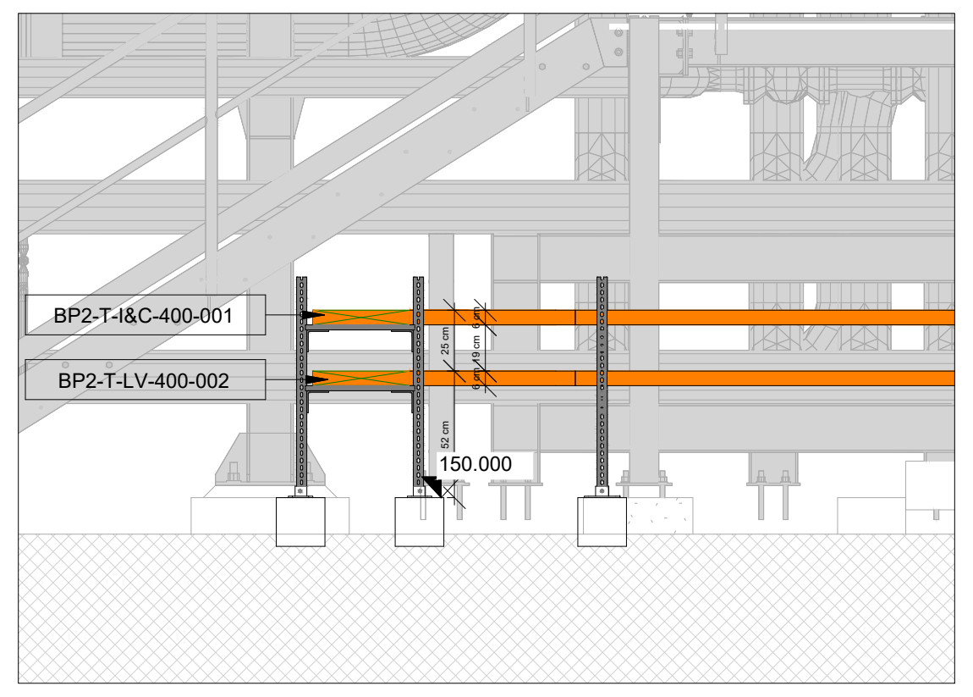


THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-8-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?

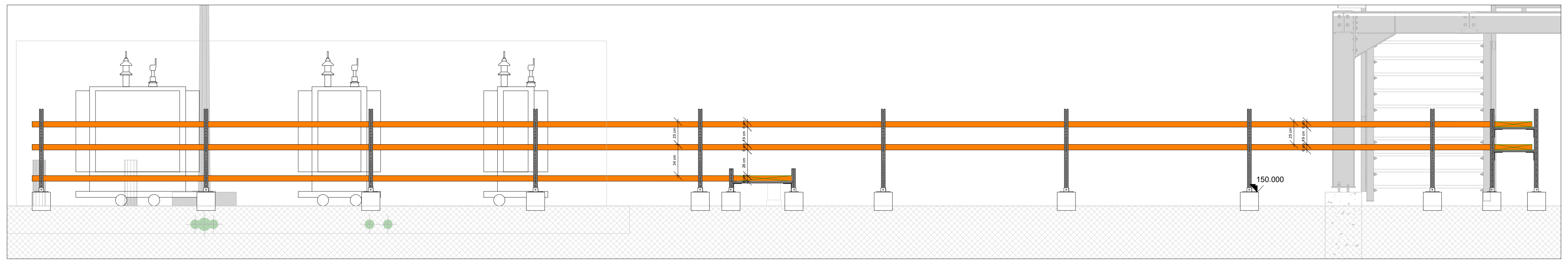
AREA BP2 PLAN
SCALE:1/40



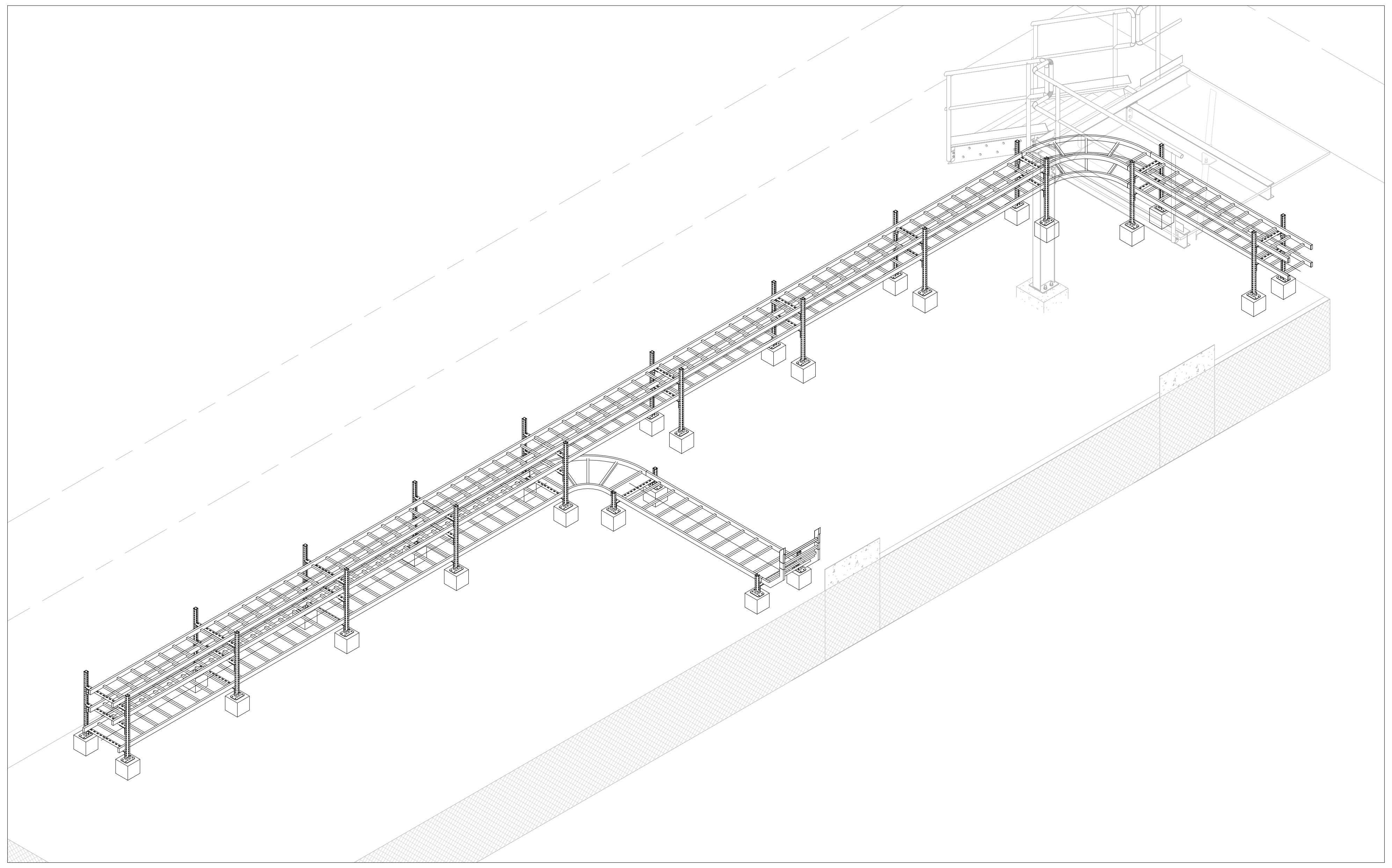
SECTION N-N
SCALE:1/50



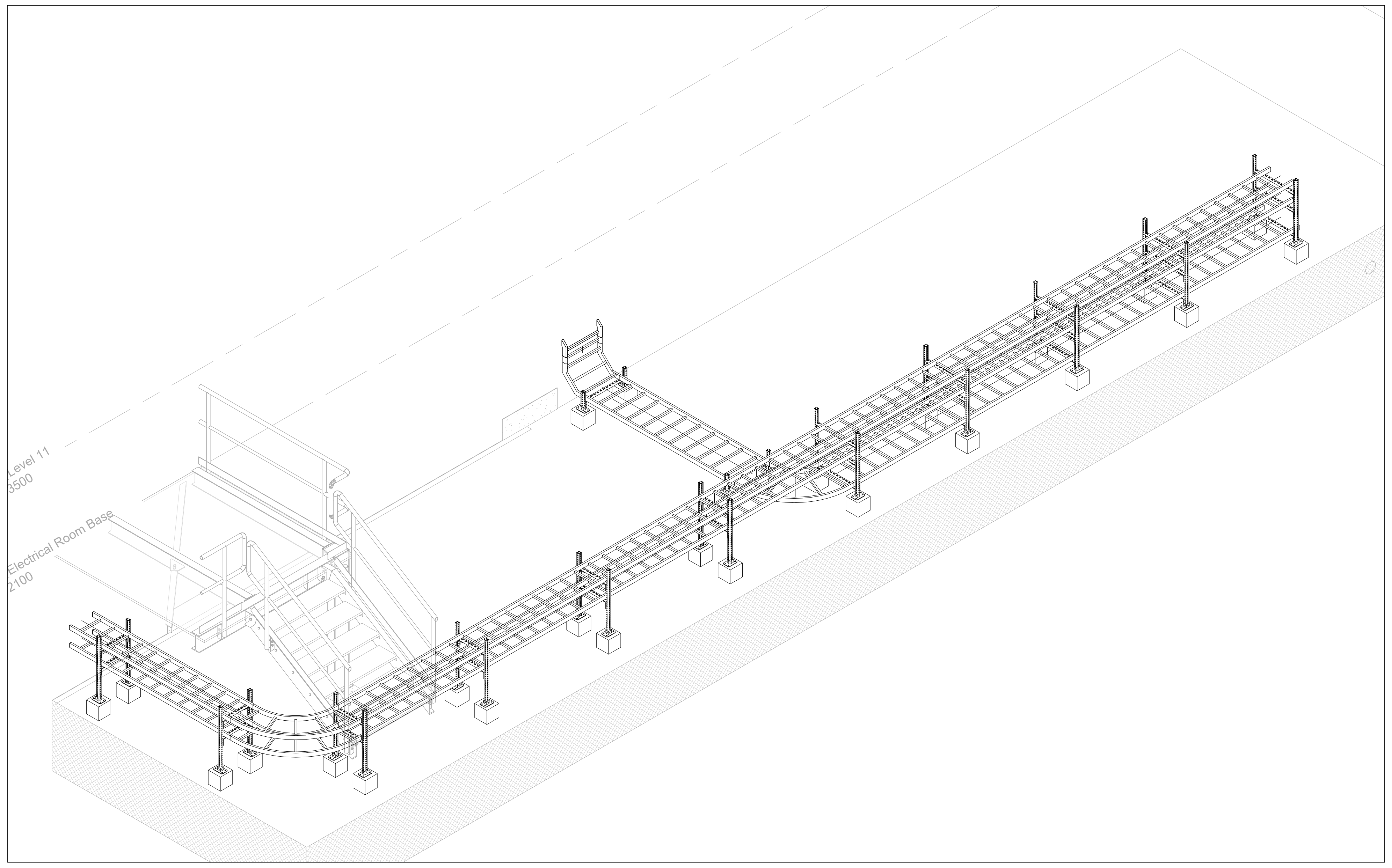
SECTION P-P
SCALE:1/50



SECTION R-R
SCALE:1/50

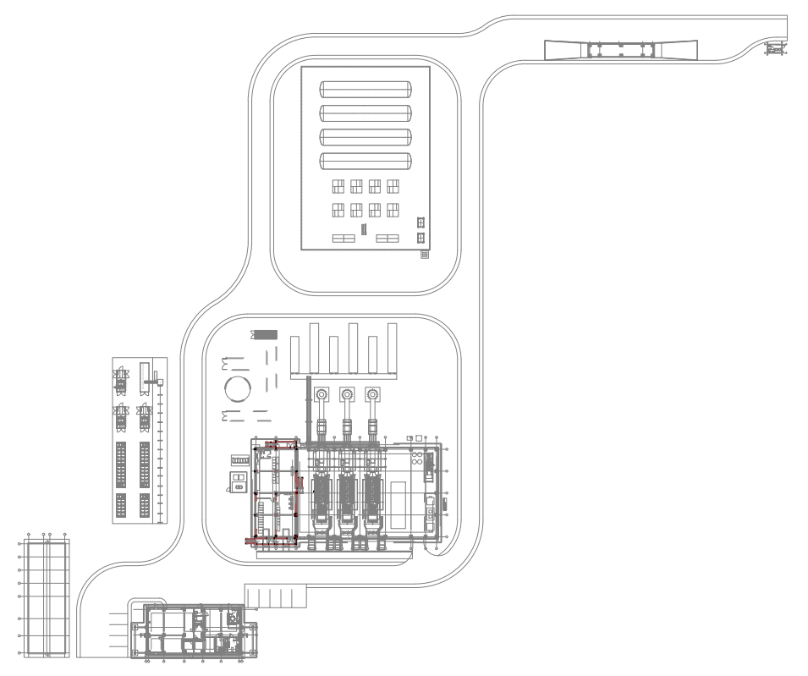


ISOMETRIC VIEW
SCALE:1/50



ISOMETRIC VIEW
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

NOTES:

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NOTES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

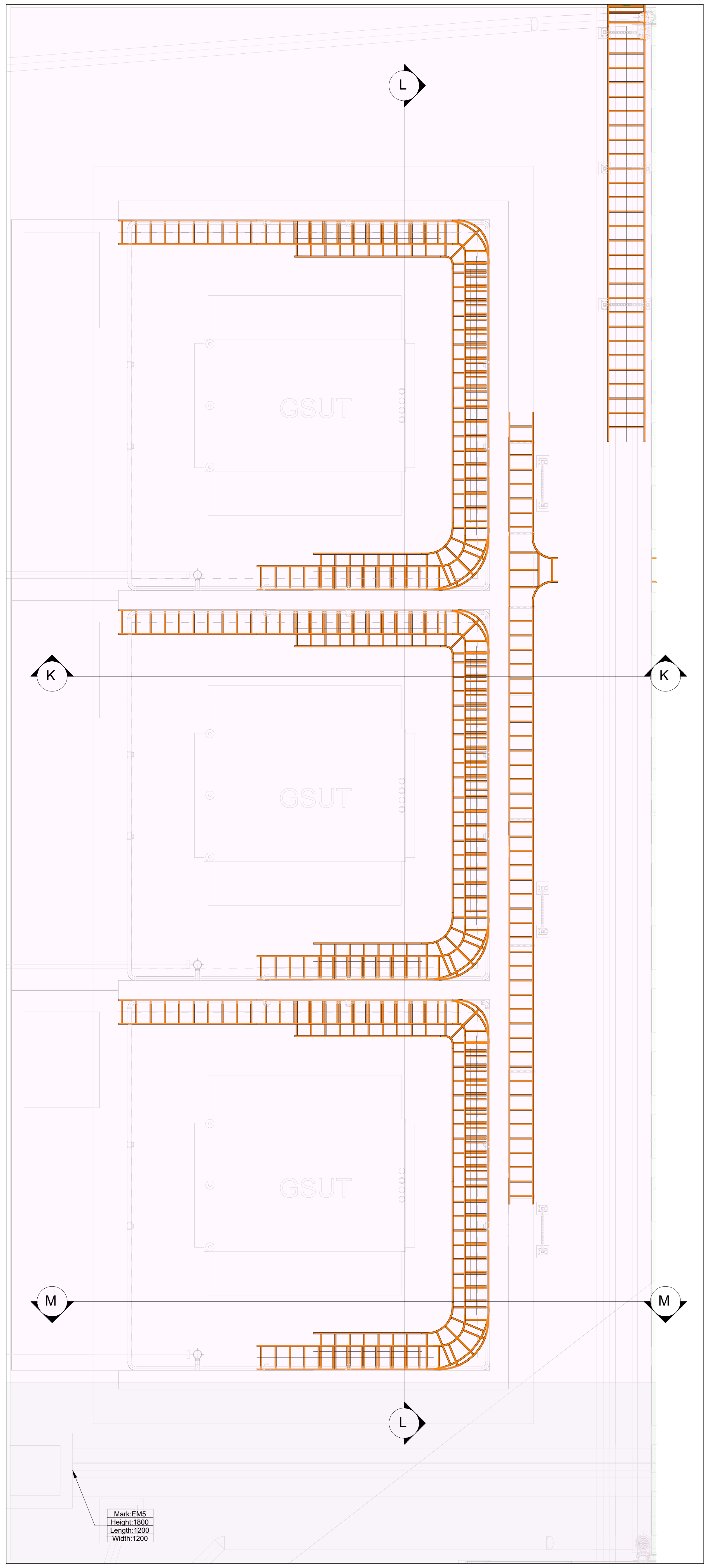
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

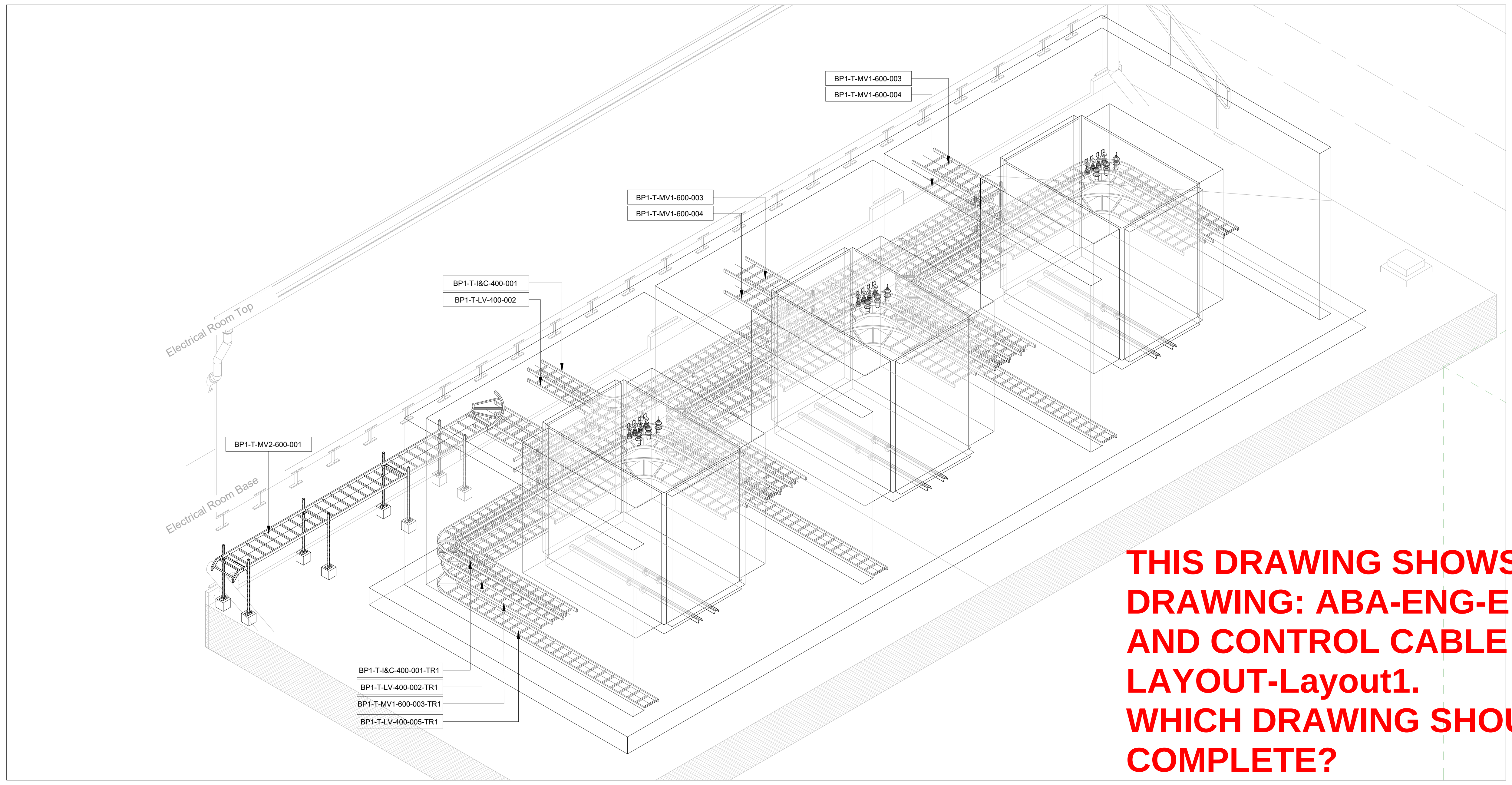
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2130

SHEET:
8
OF:
16

DRAWING NAME:
POWER AND CONTROL CABLE ROUTING
GENERAL LAYOUT

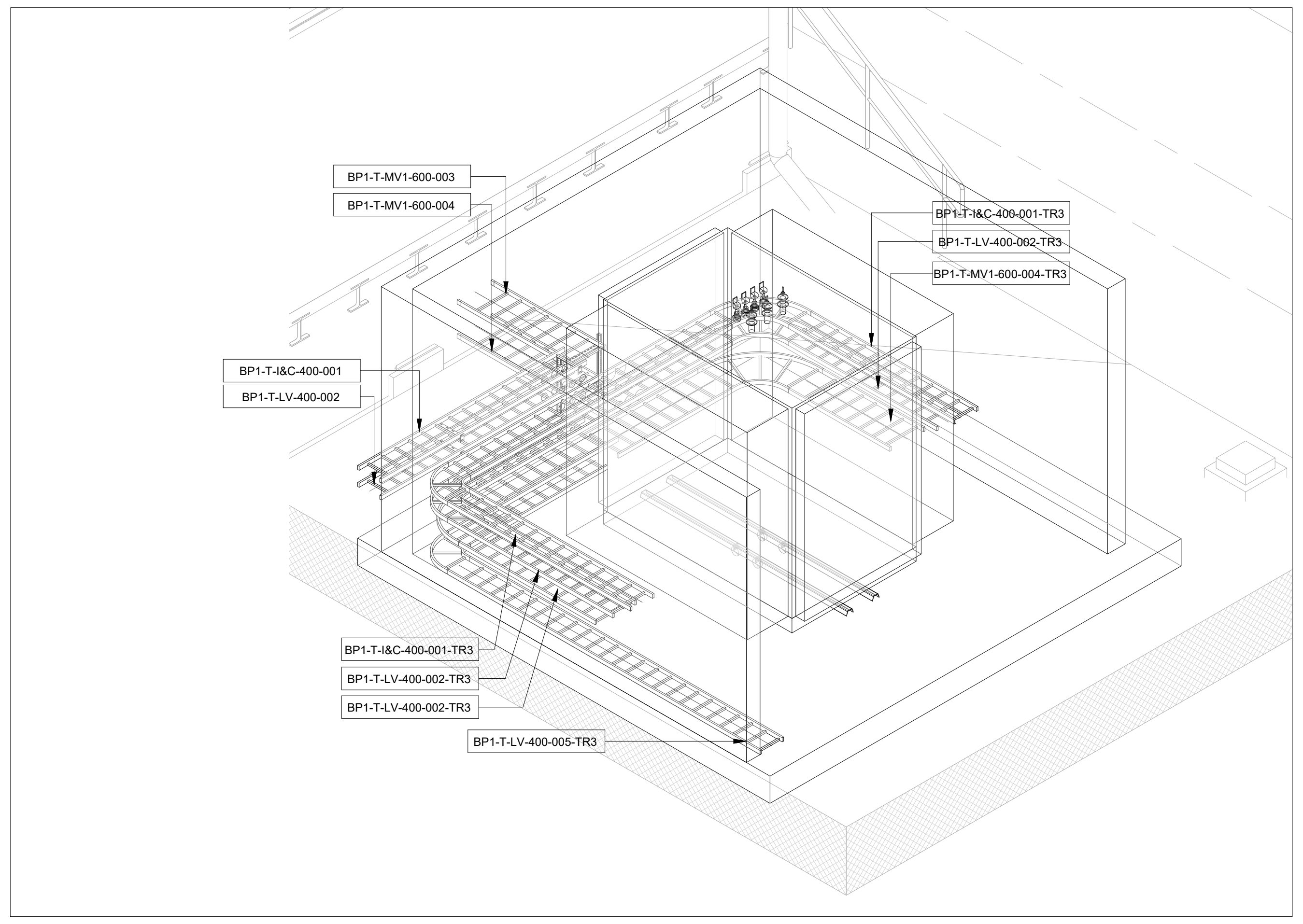

L
K
K
M
M
L
GSUT
GSUT
GSUT
Mark:EM5
Height:1800
Length:1200
Width:1200

AREA BP1 PLAN
SCALE:1/40

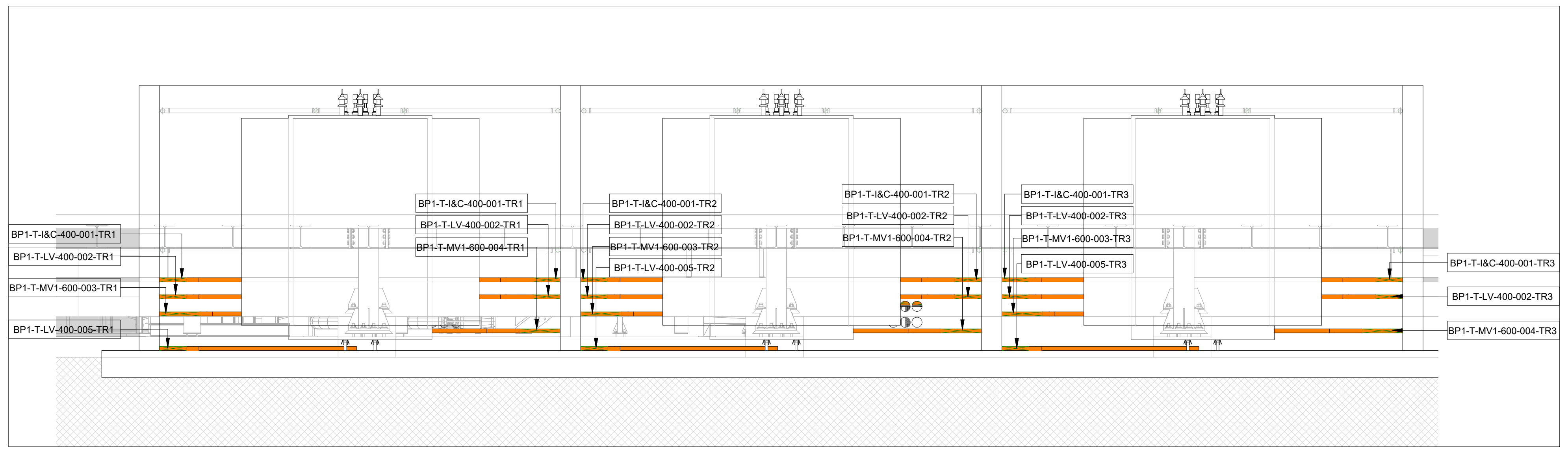

BP1-T-MV1-600-003
BP1-T-MV1-600-004
BP1-T-MV1-600-003
BP1-T-MV1-600-004
BP1-T-I&C-400-001
BP1-T-LV-400-002
Electrical Room Top
BP1-T-MV2-600-001
Electrical Room Base
BP1-T-I&C-400-001-TR1
BP1-T-LV-400-002-TR1
BP1-T-MV1-600-003-TR1
BP1-T-LV-400-005-TR1

ISOMETRIC VIEW
SCALE:1/50

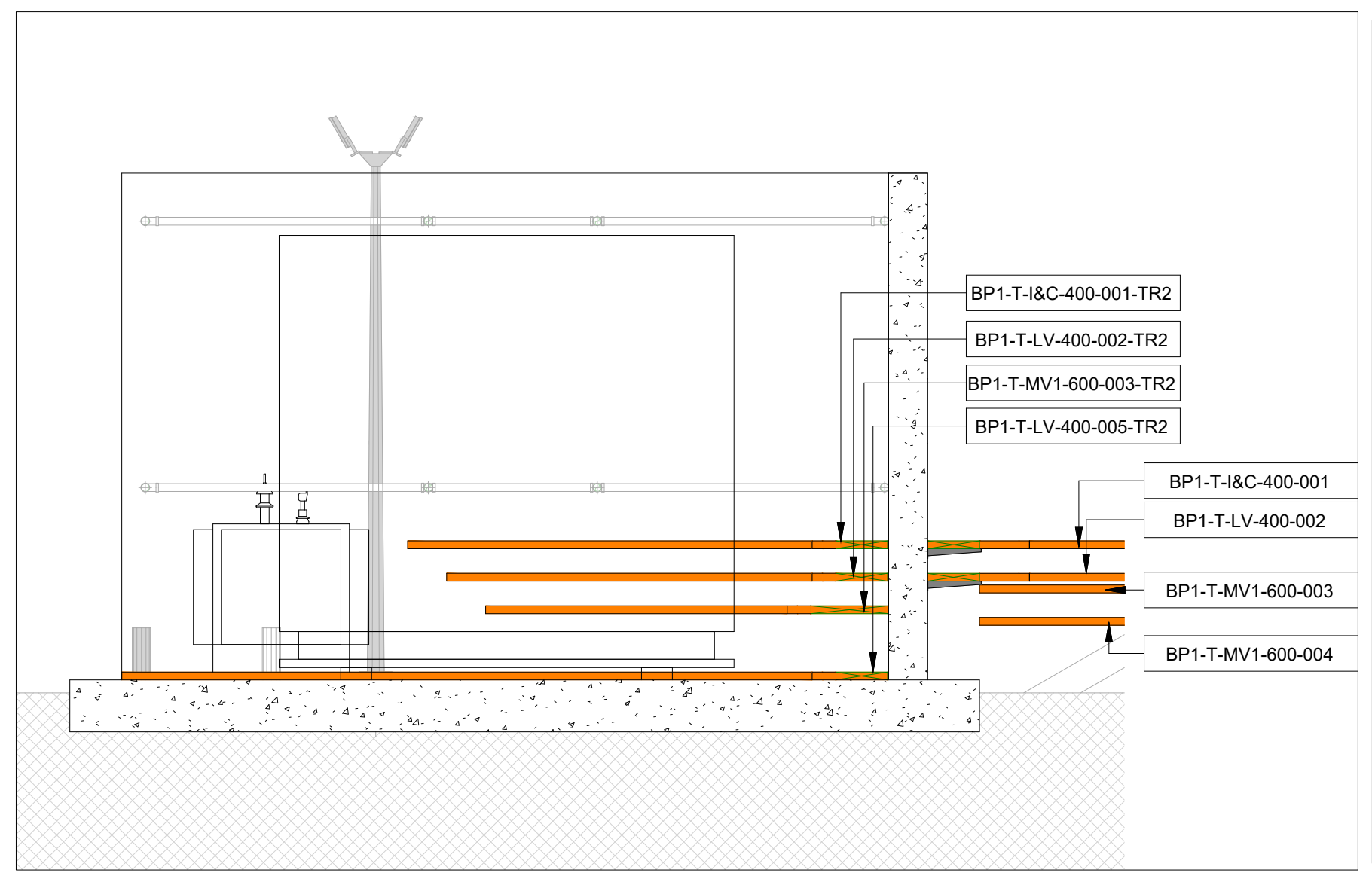
THIS DRAWING SHOWS THE SAME AS THAT OF DRAWING: ABA-ENG-ELC-DRW-2130-9-16-REV.1-POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT-Layout1.
WHICH DRAWING SHOULD BE CONSIDERED AS 60% COMPLETE?


BP1-T-MV1-600-003
BP1-T-MV1-600-004
BP1-T-I&C-400-001-TR3
BP1-T-LV-400-002-TR3
BP1-T-MV1-600-004-TR3
BP1-T-I&C-400-001
BP1-T-LV-400-002
BP1-T-I&C-400-001-TR3
BP1-T-LV-400-002-TR3
BP1-T-LV-400-002-TR3
BP1-T-LV-400-005-TR3

ISOMETRIC VIEW
SCALE:1/50


BP1-T-I&C-400-001-TR1
BP1-T-LV-400-002-TR1
BP1-T-MV1-600-003-TR1
BP1-T-LV-400-005-TR1
BP1-T-I&C-400-001-TR1
BP1-T-LV-400-002-TR1
BP1-T-MV1-600-004-TR1
BP1-T-I&C-400-001-TR2
BP1-T-LV-400-002-TR2
BP1-T-MV1-600-003-TR2
BP1-T-LV-400-005-TR2
BP1-T-I&C-400-001-TR2
BP1-T-LV-400-002-TR2
BP1-T-MV1-600-004-TR2
BP1-T-I&C-400-001-TR3
BP1-T-LV-400-002-TR3
BP1-T-MV1-600-003-TR3
BP1-T-LV-400-005-TR3
BP1-T-I&C-400-001-TR3
BP1-T-LV-400-002-TR3
BP1-T-MV1-600-004-TR3

SECTION K-K
SCALE:1/50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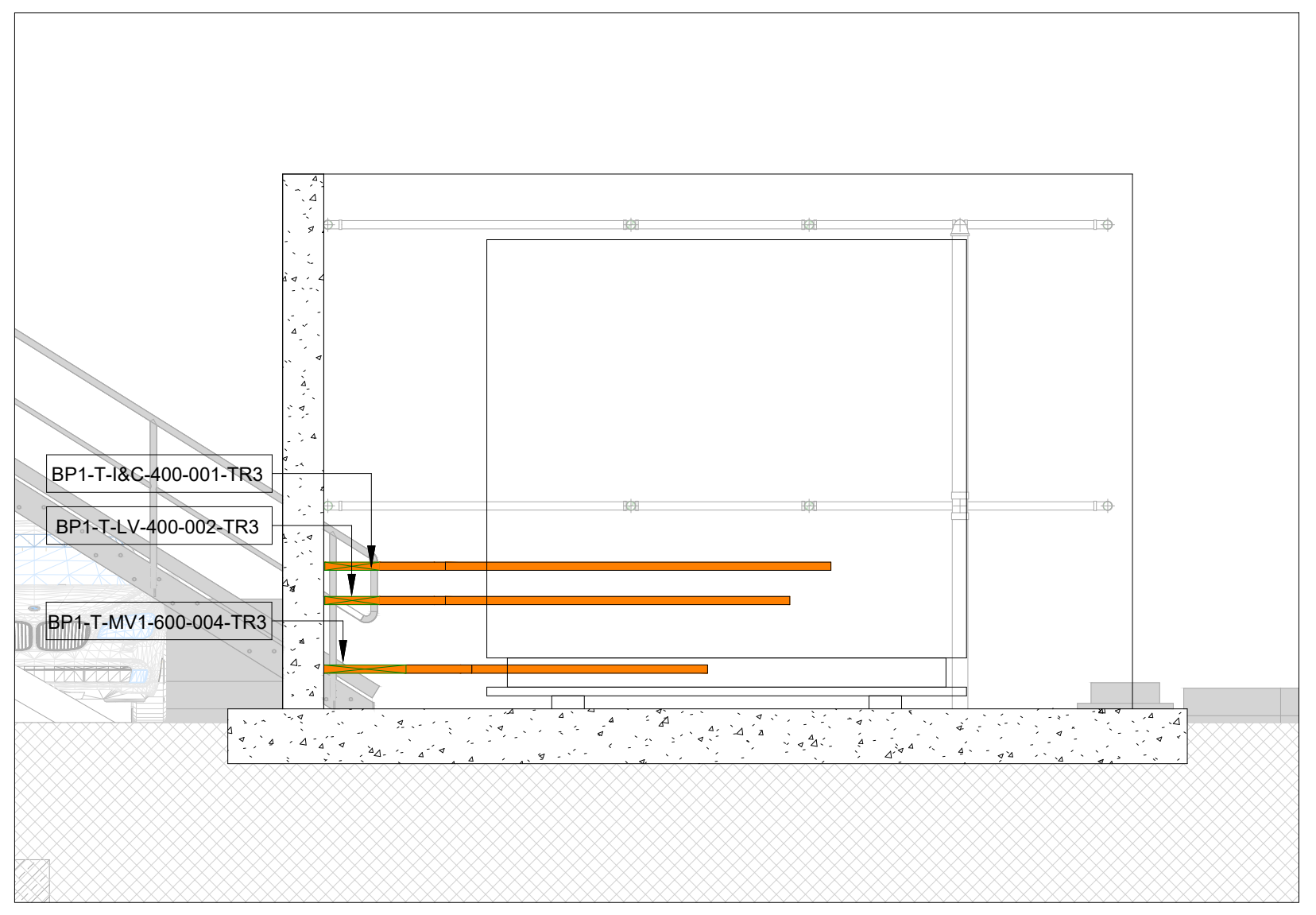
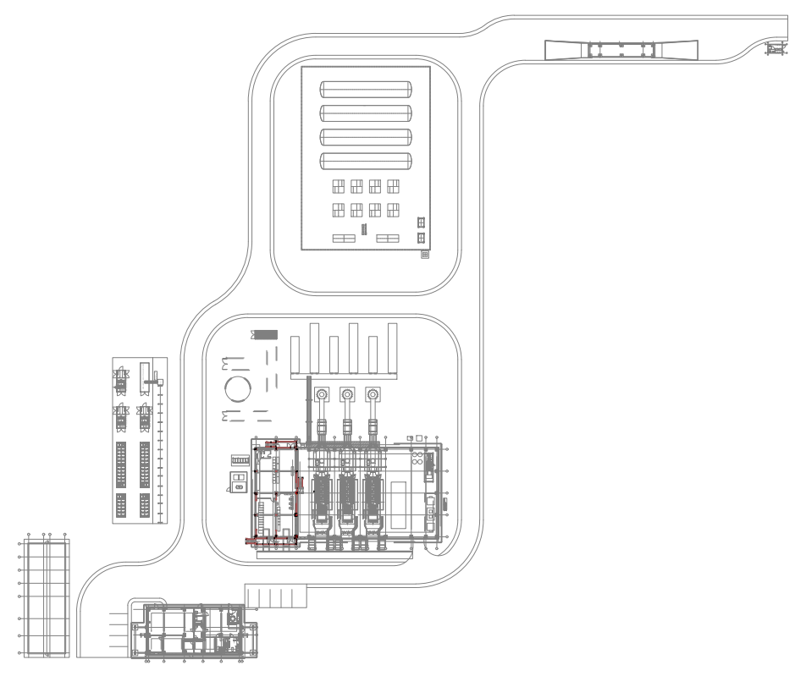
BP1-T-LV-400-002-TR2
BP1-T-MV1-600-003-TR2
BP1-T-LV-400-005-TR2
BP1-T-I&C-400-001
BP1-T-LV-400-002
BP1-T-MV1-600-003
BP1-T-MV1-600-004

SECTION L-L
SCALE:1/50


BP1-T-I&C-400-001-TR3
BP1-T-LV-400-002-TR3
BP1-T-MV1-600-004-TR3

SECTION M-M
SCALE:1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-GEN-LYT-0001- PROJECT LAYOUT
ABA-ENG-GEN-LYT-0002- GAS WORKS POWER PLANT LAYOUT
ABA-ENG-GEN-LYT-0003- GAS WORKS POWER ISLAND LAYOUT
ABA-ENG-CVL-DRW-0200~0203- CIVIL DRAWING
ABA-ENG-CVL-DRW-0020~0024- RELATED STEEL DRAWING

RELATED DRAWINGS

LEGEND

GENERAL NOTES

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NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

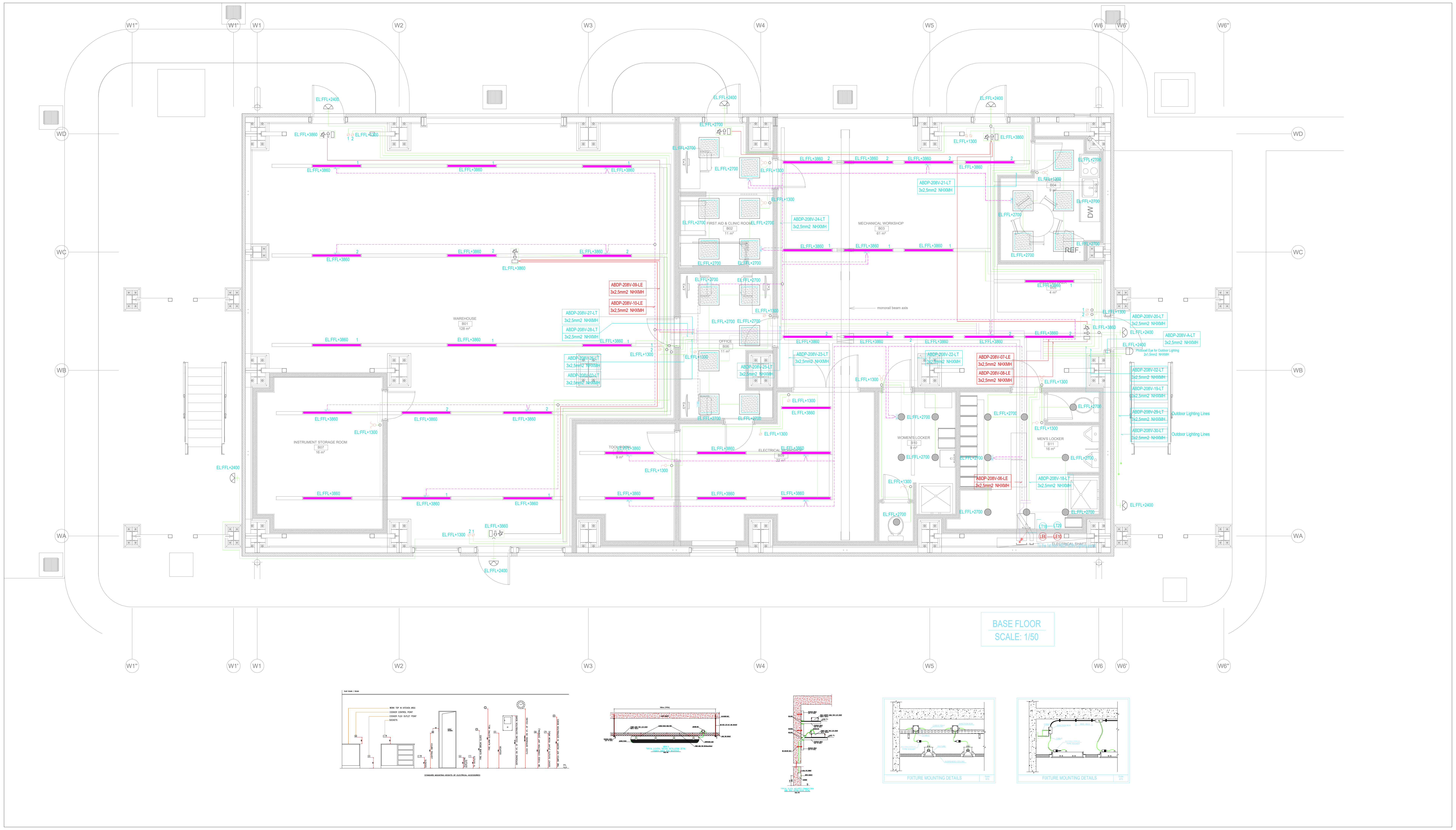
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	-	1	11 Feb 26	For Approval	D.K.	M.S.	M.S.
		0	17 Nov 25	For Approval	D.K.	M.S.	M.S.

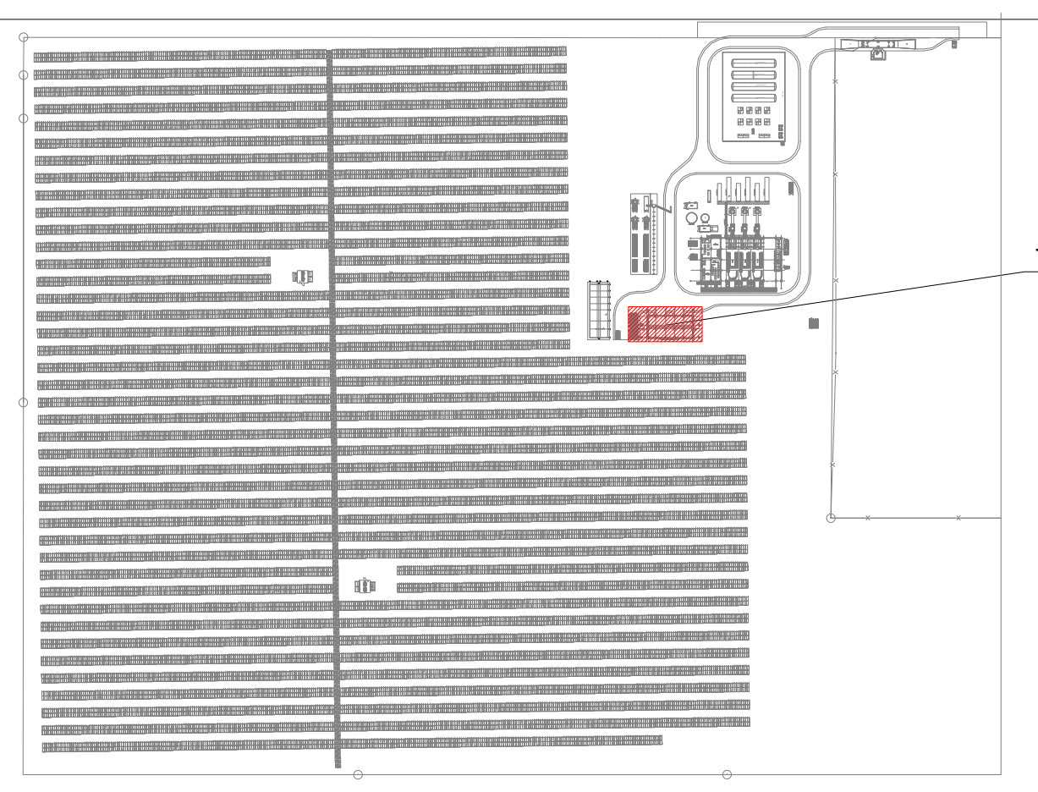
DRAWING NUMBER: ABA-ENG-ELC-DRW-2130
SHEET: 9
OF: 16
DRAWING NAME: POWER AND CONTROL CABLE ROUTING GENERAL LAYOUT

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2201-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING PLAN-1, PLUS -2. SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.



BASE FLOOR
SCALE: 1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2206 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY PLANS
ABA-ENG-ELC-DRW-2209 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM
ABA-ENG-CVL-ARC-0003 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FLOOR PLANS
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT
ABA-ENG-ELC-CAL-2220 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING CALCULATION

LEGEND

SYMBOL LIST	
●	20W Recessed LED Downlight 120V 60Hz
▬	28W Surface Mounted LED Lighting Fixture 120V 60Hz
▨	34W 60x60 Recessed LED Lighting Fixture 120V 60Hz
◁	18W Wall Mounted Lighting Fixture 120V 60Hz
D	Photocell Eye 120V 60Hz
⇩	5 W Type-1 Emergency Guidance Luminaire (One-Faced) 120V 60Hz (3 hours)
⇨	5W Type-2 Emergency Guidance Luminaire (One-Faced) 120V 60Hz (3 hours)
⊞	Emergency Lighting Kit (3 hours)
○	One Gang One-Way Switch
○	Two Gang One-Way Switch
⊘	Pulse Current Switch
◿	ABDP-208V UPS UPS Panel
◢	ABDP-208V Lighting Panel
▬	ABDP-480V Main Power Panel
○	Junction Box
—●	Ligthing Feeding
ABDP-208V-01-LT 3x2,5mm2 NHXMH	Normal Lighting Line Number
ABDP-208V UPS-01-LE 3x2,5mm2 NHXMH	UPS Lighting Line Number
↗	Coming From Below
↗	Going from Bottom to Top
↙	Coming from Above to Below
↙	Going from Top to Bottom

GENERAL NOTES

EQUIPMENT TAGGING PROCEDURE:

DISTRIBUTION PANEL NUMBER
CIRCUIT NAME
TYPE OF EQUIPMENT:
LT - NORMAL LIGHTING FIXTURE
LE - EMERGENCY LIGHTING FIXTURE

Example Tag: ABDP-208V-18-LT
ABDP-208V-08-LE

1. THE LIGHTING LINE WILL BE MADE WITH 2.5 mm2 NHXMH CABLE.
2. THE LIGHTING SORTIE WILL BE MADE WITH 1.5 mm2 NHXMH CABLE.
3. SWITCH AND FIXTURE HEIGHTS ARE SPECIFIED IN THE PROJECT.
4. IN THE INSTALLATION MADE WITH NHXMH CABLE IN THE SUSPENDED CEILING, THE DESCENTS TO THE SWITCHES AND SOCKETS ARE MADE WITH PVC PIPES UNDER PLASTER IT WILL BE MADE WITH NHXMH CABLE INSIDE.
5. PORCELAIN OR COMPRESSION TYPE TERMINALS WILL BE USED INSIDE THE JUNCTION BOXES.

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
A0	1/50

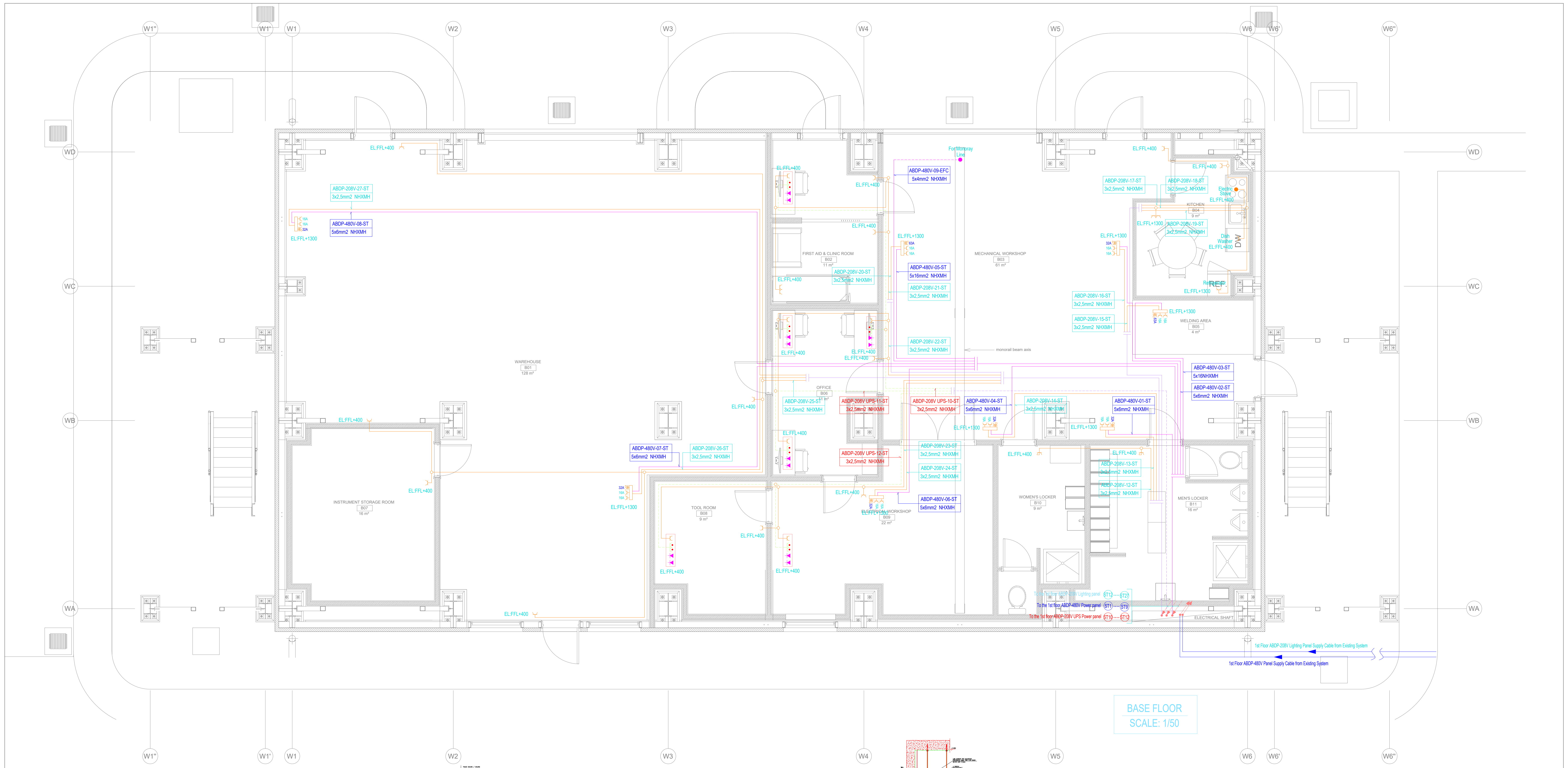
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2201

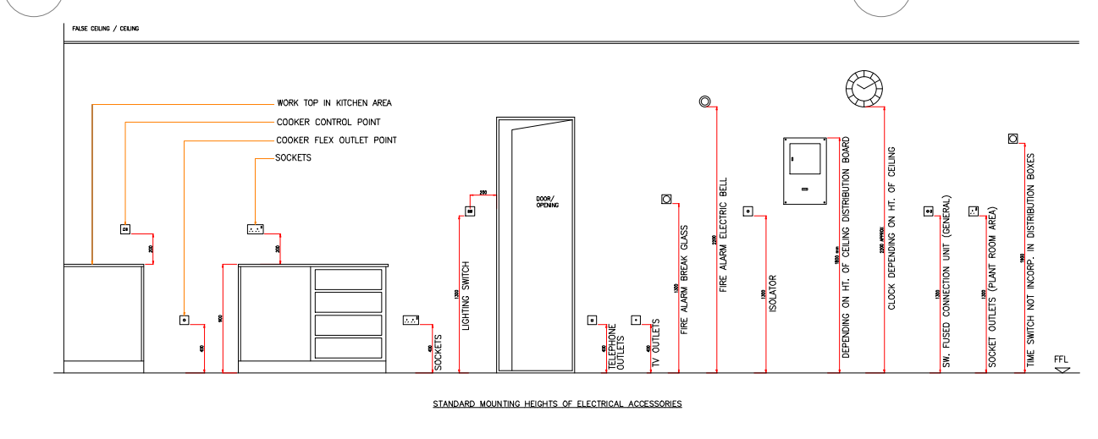
SHEET: 1
OF: 2

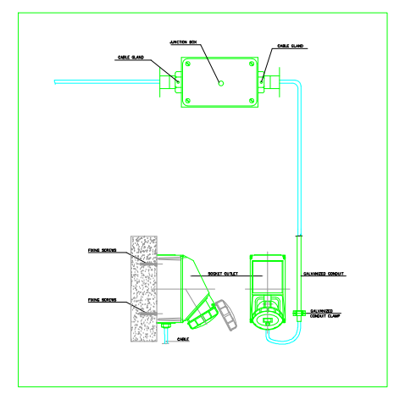
DRAWING NAME:
ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING PLAN

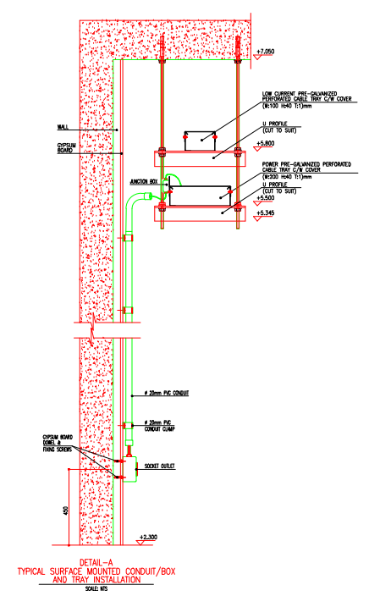
THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2205-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SOCKET PLAN-1, PLUS -2. SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.


W1'
W1
W2
W3
W4
W5
W6
W6'
W6''
WD
WC
WB
WA
WAREHOUSE
B01
128 m²
INSTRUMENT STORAGE ROOM
B07
16 m²
TOOL ROOM
B08
9 m²
FIRST AID & CLINIC ROOM
B02
11 m²
MECHANICAL WORKSHOP
B03
61 m²
KITCHEN
B04
9 m²
WELDING AREA
B05
4 m²
OFFICE
B06
ELECTRICAL WORKSHOP
B09
22 m²
WOMEN'S LOCKER
B10
9 m²
MEN'S LOCKER
B11
16 m²
ELECTRICAL SHAFT
For Monoray Line
monorail beam axis
Electric Stove
Dish Washer
DW
Refrigerator
REF.
EL:FFL+400
EL:FFL+1300
ABDP-208V-27-ST
3x2,5mm2 NHXMH
ABDP-480V-08-ST
5x6mm2 NHXMH
ABDP-480V-07-ST
5x6mm2 NHXMH
ABDP-208V-26-ST
3x2,5mm2 NHXMH
ABDP-480V-09-EFC
5x4mm2 NHXMH
ABDP-480V-05-ST
5x16mm2 NHXMH
ABDP-208V-20-ST
ABDP-208V-21-ST
ABDP-208V-22-ST
ABDP-208V-25-ST
ABDP-208V UPS-11-ST
ABDP-208V UPS-10-ST
ABDP-208V UPS-12-ST
ABDP-480V-04-ST
ABDP-208V-14-ST
ABDP-480V-01-ST
ABDP-208V-23-ST
ABDP-208V-24-ST
ABDP-480V-06-ST
ABDP-208V-13-ST
ABDP-208V-12-ST
ABDP-208V-17-ST
ABDP-208V-18-ST
ABDP-208V-19-ST
ABDP-208V-16-ST
ABDP-208V-15-ST
ABDP-480V-03-ST
5x16NHXMH
ABDP-480V-02-ST
5x6mm2 NHXMH
16A
32A
63A
To the 1st floor ABDP-208V Lighting panel ST12 ···· ST27
To the 1st floor ABDP-480V Power panel ST1 ···· ST9
To the 1st floor ABDP-208V UPS Power panel ST10 ···· ST12
1st Floor ABDP-208V Lighting Panel Supply Cable from Existing System
1st Floor ABDP-480V Panel Supply Cable from Existing System

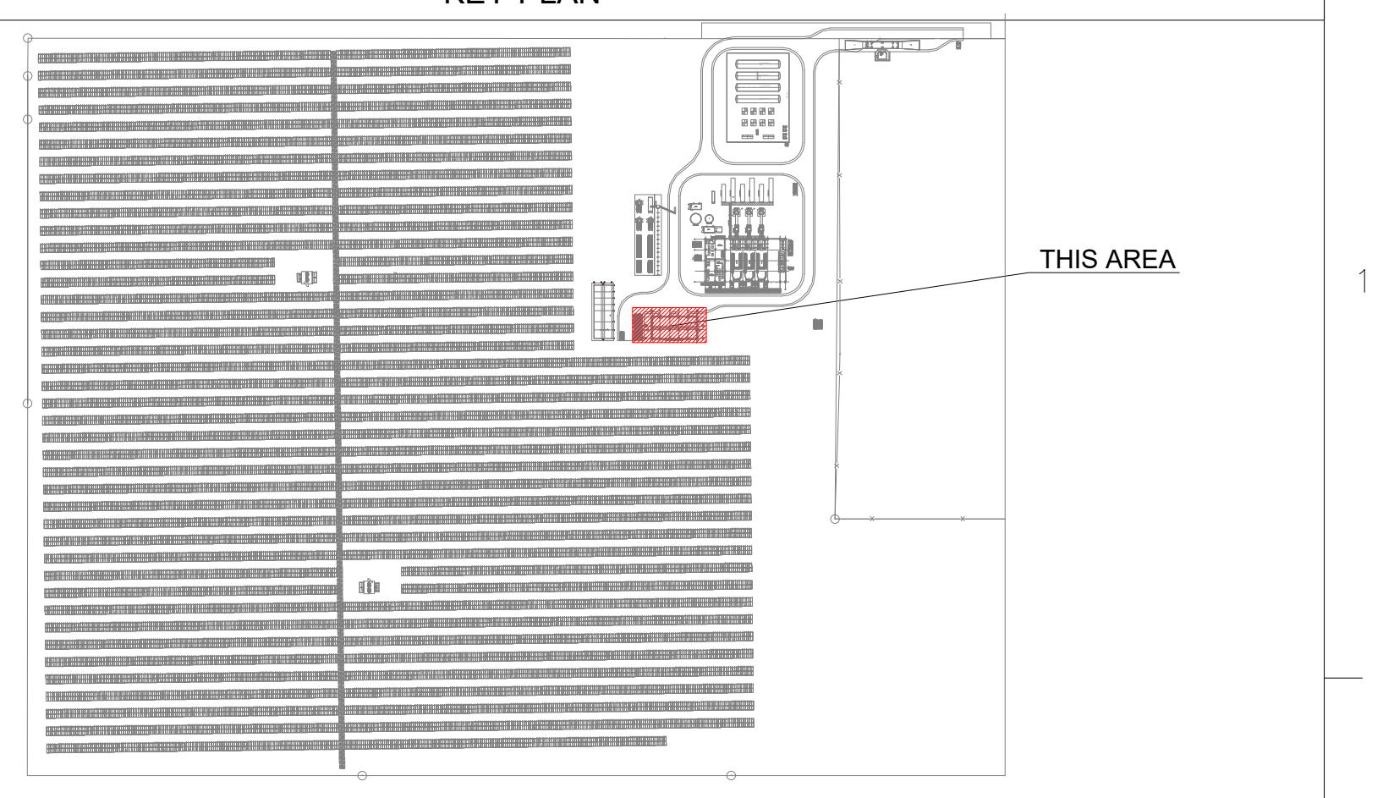
BASE FLOOR
SCALE: 1/50







KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2206 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY PLANS
ABA-ENG-ELC-DRW-2209 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM
ABA-ENG-CVL-ARC-0003 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FLOOR PLANS
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

SYMBOL LIST	
◡	Single Grounded Socket 120VAC 60hz Type B
◡	Single Grounded Socket 120VAC 60hz Type B
◡◡	Double Grounded Triple Socket 120VAC 60hz Type B
●	Single Grounded UPS Socket 120VAC 60hz Type B
● ●	Double Grounded UPS Socket 120VAC 60hz Type B
	Combined Socket Box
	1 Phase+2 Phase UPS + Normal Socket Group (on the wall) 120VAC 60hz Type B
▱	ABDP-208V UPS UPS Panel
◪	ABDP-208V Lighting Panel
▬	ABDP-480V Main Power Panel
○	Junction box
●	Feeding
ABDP-208V-01-ST 3x2,5mm2 NHXMH	Normal Socket Line Number
ABDP-480V-01-ST 5x2,5mm2 NHXMH	Power Socket Line Number
ABDP-208V UPS-01-ST 3x2,5mm2 NHXMH	UPS Socket Line Number
↗	Coming From Below
↗	Going from Bottom to Top
↙	Coming from Above to Below
↙	Going from Top to Bottom

GENERAL NOTES

EQUIPMENT TAGGING PROCEDURE:

Example Tag: ABDP-208V-23-ST
ABDP-480V-06-ST
ABDP-208V UPS-12-ST

- DISTRIBUTION PANEL NUMBER
- CIRCUIT NAME
- TYPE OF EQUIPMENT:
  ST - NORMAL SOCKET

1. THE SOCKET LINE WILL BE MADE WITH 2.5 mm2 NHXMH CABLE.
2. THE SOCKET SORTIE WILL BE MADE WITH 2.5 mm2 NHXMH CABLE.
3. SOCKET HEIGHTS ARE SPECIFIED IN THE PROJECT.
4. IN THE INSTALLATION MADE WITH NHXMH CABLE IN THE SUSPENDED CEILING, THE DESCENTS TO THE SWITCHES AND SOCKETS ARE MADE WITH PVC PIPES UNDER PLASTER IT WILL BE MADE WITH NHXMH CABLE INSIDE.
5. PORCELAIN OR COMPRESSION TYPE TERMINALS WILL BE USED INSIDE THE JUNCTION BOXES.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

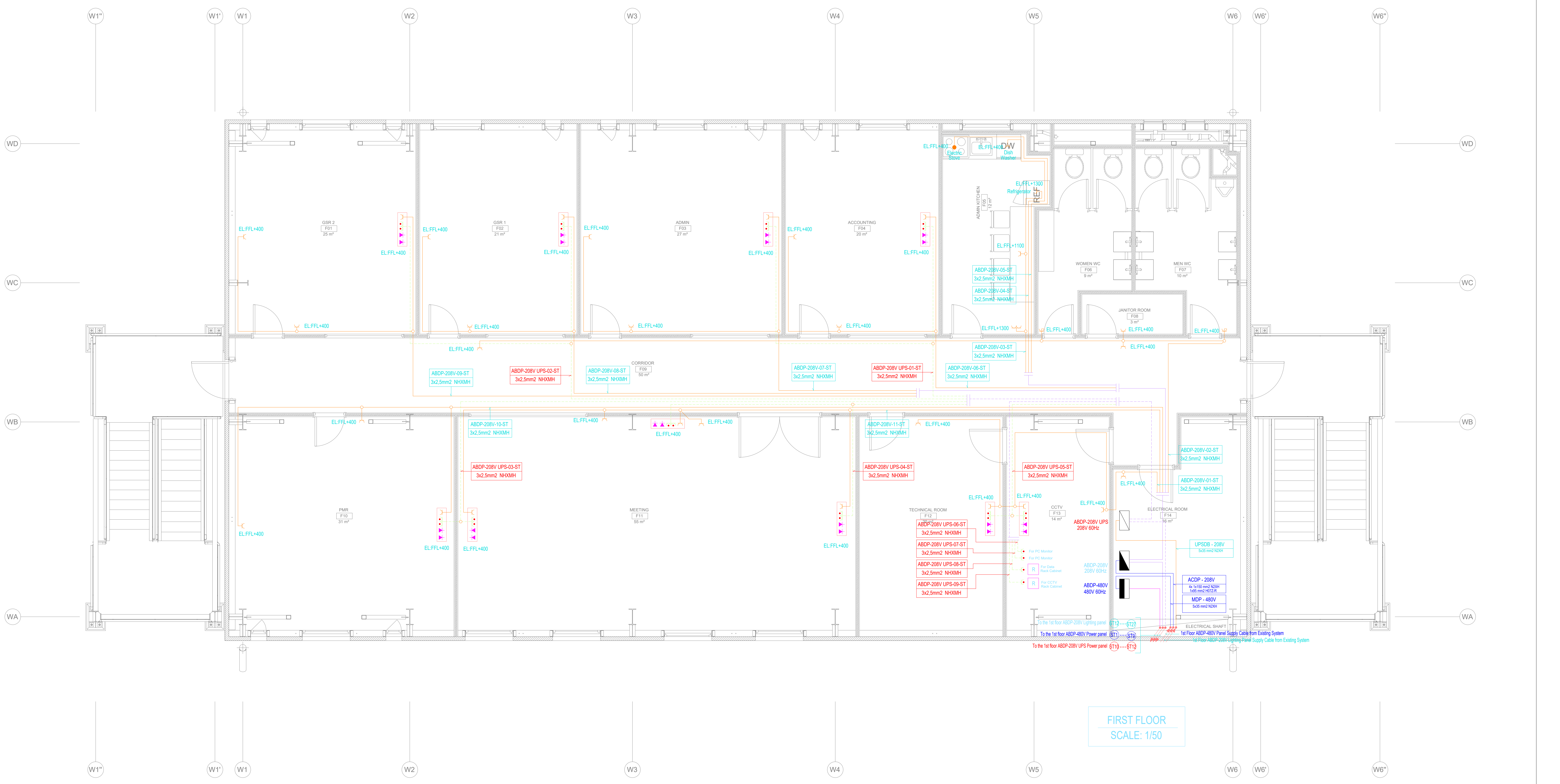
SIZE	SCALE
A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	30.12.25	FOR REVIEW	M.G.	C.U.	M.S.
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2205

SHEET: 1
OF: 2

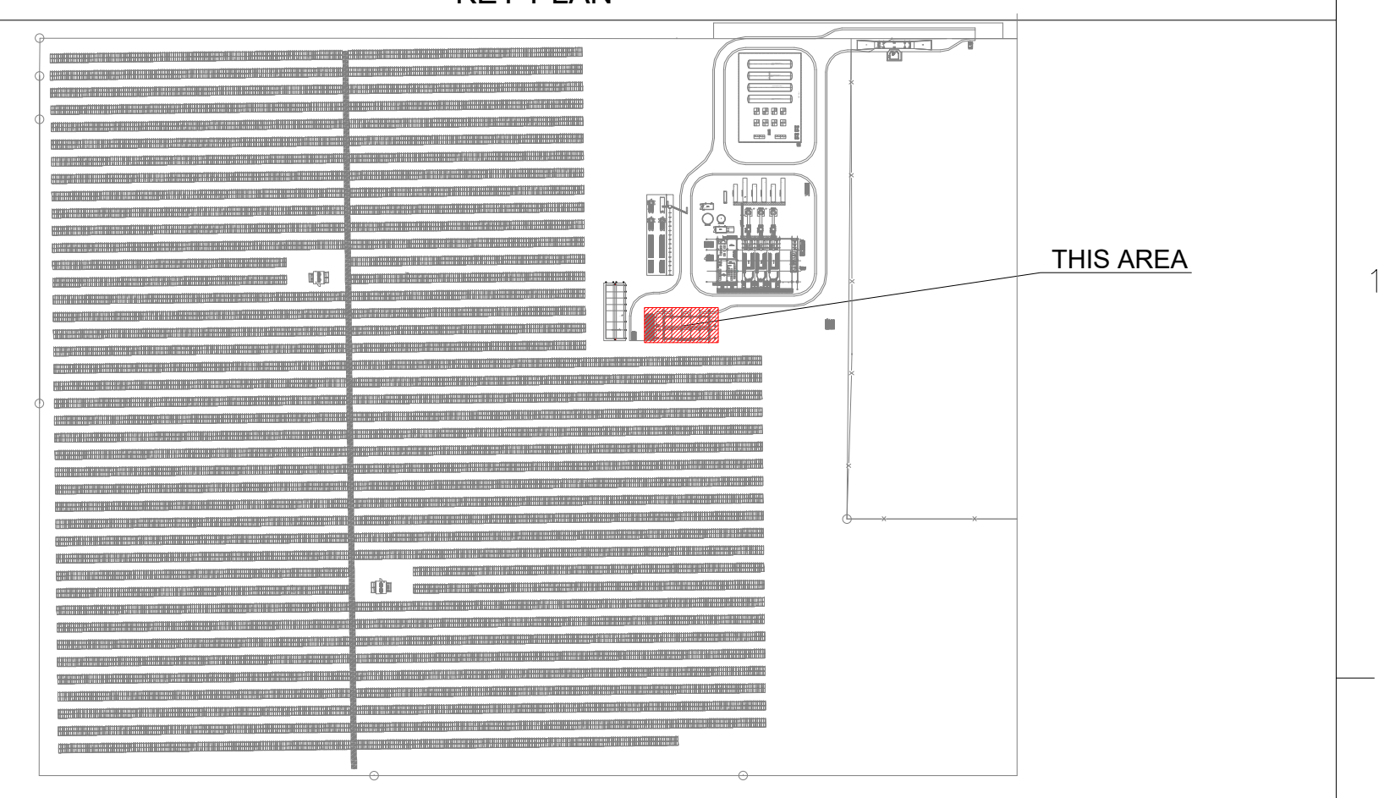
DRAWING NAME:
WAREHOUSE AND ADMINISTRATION BUILDING
SOCKET PLANS


W1''
W1'
W1
W2
W3
W4
W5
W6
W6'
W6''
WD
WC
WB
WA
GSR 2
F01
25 m²
GSR 1
F02
21 m²
ADMIN
F03
27 m²
ACCOUNTING
F04
20 m²
ADMIN KITCHEN
F05
12 m²
WOMEN WC
F06
9 m²
MEN WC
F07
10 m²
JANITOR ROOM
F08
3 m²
CORRIDOR
F09
50 m²
PMR
F10
MEETING
F11
TECHNICAL ROOM
F12
20 m²
CCTV
F13
14 m²
ELECTRICAL ROOM
F14
16 m²
ELECTRICAL SHAFT
EL:FFL+400
EL:FFL+1100
EL:FFL+1300
Electric Stove
DW
Dish Washer
REF
Refrigerator
ABDP-208V-01-ST 3x2,5mm2 NHXMH
ABDP-208V-02-ST 3x2,5mm2 NHXMH
ABDP-208V-03-ST 3x2,5mm2 NHXMH
ABDP-208V-04-ST 3x2,5mm2 NHXMH
ABDP-208V-05-ST 3x2,5mm2 NHXMH
ABDP-208V-06-ST 3x2,5mm2 NHXMH
ABDP-208V-07-ST 3x2,5mm2 NHXMH
ABDP-208V-08-ST 3x2,5mm2 NHXMH
ABDP-208V-09-ST 3x2,5mm2 NHXMH
ABDP-208V-10-ST 3x2,5mm2 NHXMH
ABDP-208V-11-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-01-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-02-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-03-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-04-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-05-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-06-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-07-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-08-ST 3x2,5mm2 NHXMH
ABDP-208V UPS-09-ST 3x2,5mm2 NHXMH
For PC Monitor
For PC Monitor
R
For Data Rack Cabinet
R
For CCTV Rack Cabinet
ABDP-208V UPS 208V 60Hz
ABDP-208V 208V 60Hz
ABDP-480V 480V 60Hz
UPSDB - 208V 5x35 mm2 N2XH
ACDP - 208V 4x 1x150 mm2 N2XH 1x95 mm2 H07Z-R
MDP - 480V 5x35 mm2 N2XH
To the 1st floor ABDP-208V Lighting panel
ST12 .... ST27
To the 1st floor ABDP-480V Power panel
ST1 .... ST9
To the 1st floor ABDP-208V UPS Power panel
ST10 .... ST12
1st Floor ABDP-480V Panel Supply Cable from Existing System
1st Floor ABDP-208V Lighting Panel Supply Cable from Existing System

FIRST FLOOR

SCALE: 1/50

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2206 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY PLANS
ABA-ENG-ELC-DRW-2209 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM
ABA-ENG-CVL-ARC-0003 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FLOOR PLANS
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

SYMBOL LIST	
	Single Grounded Socket 120VAC 60hz Type B
	Single Grounded Socket 120VAC 60hz Type B
	Double Grounded Triple Socket 120VAC 60hz Type B
●	Single Grounded UPS Socket 120VAC 60hz Type B
● ●	Double Grounded UPS Socket 120VAC 60hz Type B
	Combined Socket Box
	1 Phase+2 Phase UPS + Normal Socket Group (on the wall) 120VAC 60hz Type B
◿	ABDP-208V UPS UPS Panel
◢	ABDP-208V Lighting Panel
▬	ABDP-480V Main Power Panel
○	Junction box
🟢	Feeding
ABDP-208V-01-ST 3x2,5mm2 NHXMH	Normal Socket Line Number
ABDP-480V-01-ST 5x2,5mm2 NHXMH	Power Socket Line Number
ABDP-208V UPS-01-ST 3x2,5mm2 NHXMH	UPS Socket Line Number
↗	Coming From Below
↗	Going from Bottom to Top
↙	Coming from Above to Below
↙	Going from Top to Bottom

GENERAL NOTES

EQUIPMENT TAGGING PROCEDURE:

DISTRIBUTION PANEL NUMBER
CIRCUIT NAME
TYPE OF EQUIPMENT:
ST - NORMAL SOCKET

Example Tag: ABDP-208V-23-ST
ABDP-480V-06-ST
ABDP-208V UPS-12-ST

1. THE SOCKET LINE WILL BE MADE WITH 2.5 mm2 NHXMH CABLE.
2. THE SOCKET SORTIE WILL BE MADE WITH 2.5 mm2 NHXMH CABLE.
3. SOCKET HEIGHTS ARE SPECIFIED IN THE PROJECT.
4. IN THE INSTALLATION MADE WITH NHXMH CABLE IN THE SUSPENDED CEILING, THE DESCENTS TO THE SWITCHES AND SOCKETS ARE MADE WITH PVC PIPES UNDER PLASTER IT WILL BE MADE WITH NHXMH CABLE INSIDE.
5. PORCELAIN OR COMPRESSION TYPE TERMINALS WILL BE USED INSIDE THE JUNCTION BOXES.

CLIENT

EA Energy

CONTRACTOR

ILTEKNO
ADVANCED TECHNOLOGY — POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

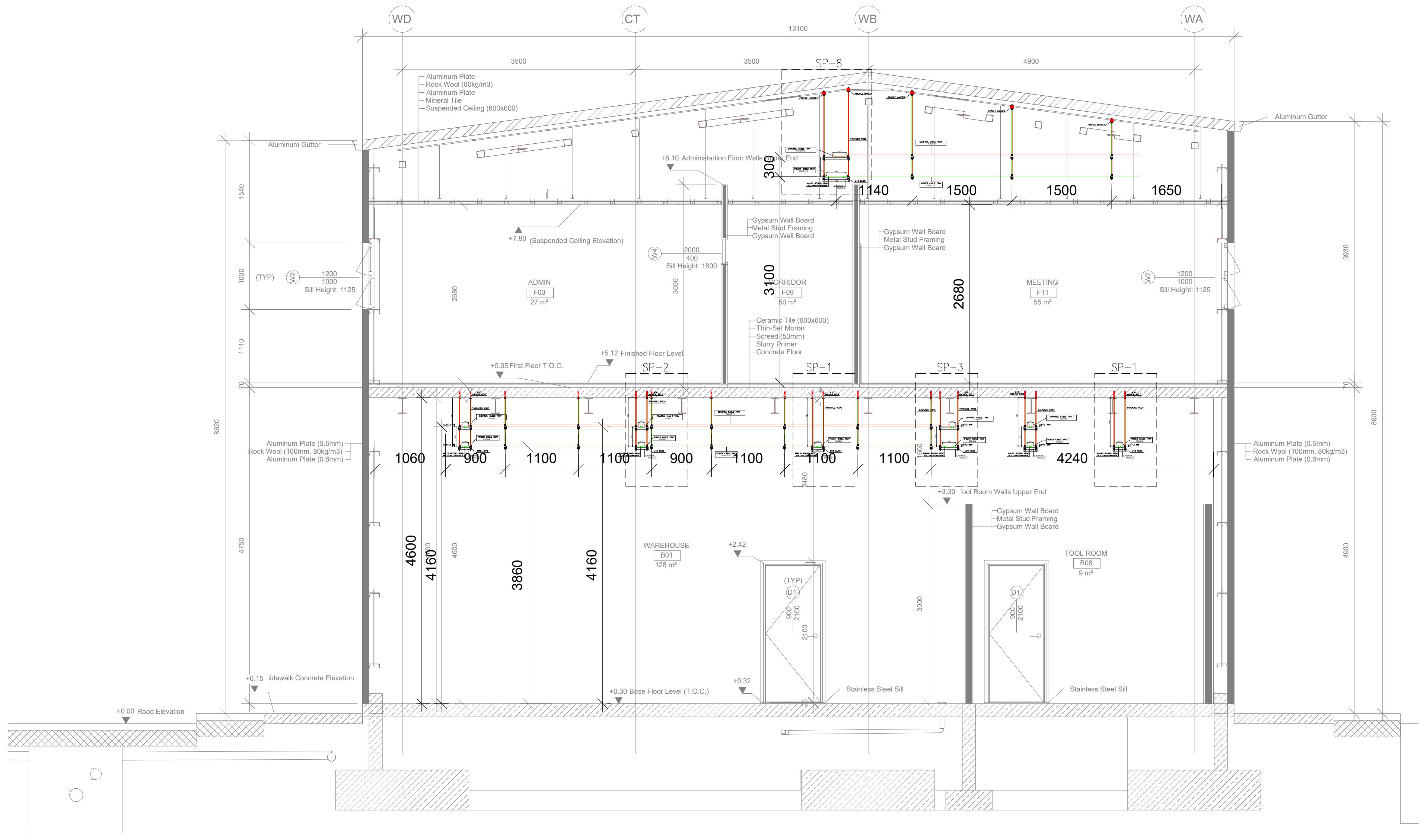
SIZE	SCALE
A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	30.12.25	FOR REVIEW	M.G.	C.U.	M.S.
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

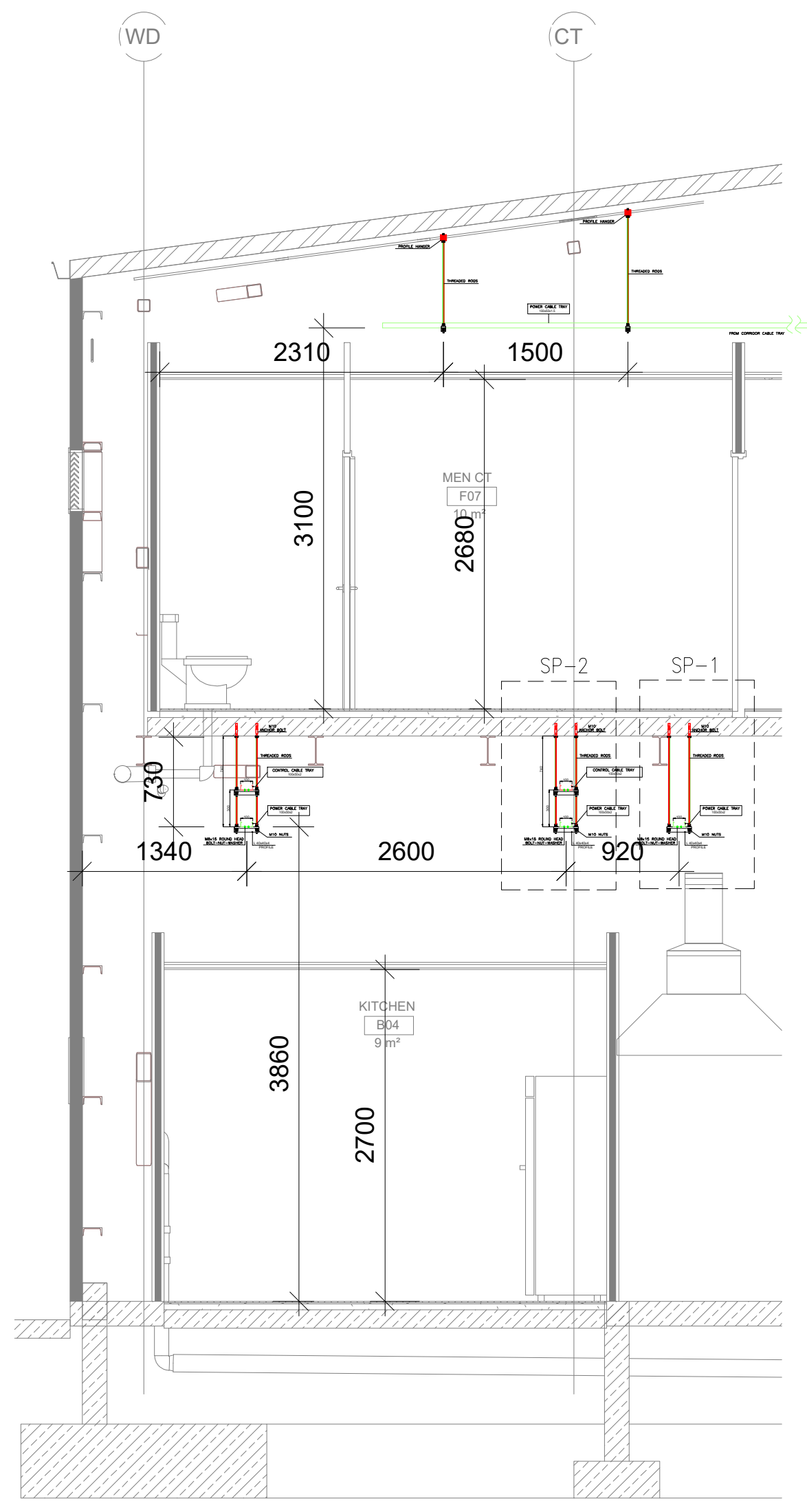
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2205

SHEET: 2
OF: 2

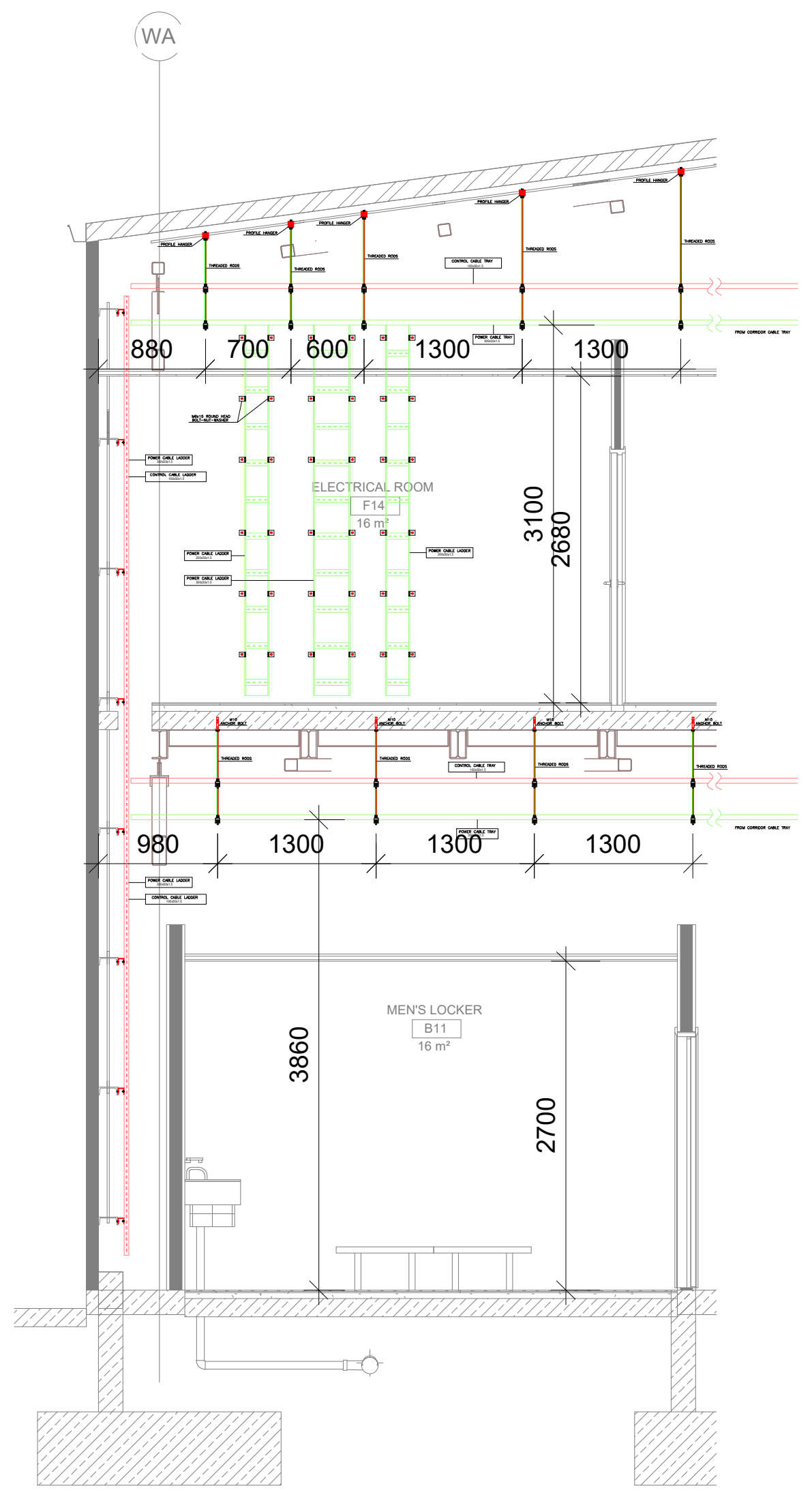
DRAWING NAME:
WAREHOUSE AND ADMINISTRATION BUILDING
SOCKET PLANS


WD
CT
WB
WA
SP-8
SP-2
SP-3
SP-1
1140
1500
1500
1650
300
3100
2680
1060
900
1100
1100
900
1100
1100
4240
4600
4160
3860
4160

A-T SECTION
SCALE: 1/50


WD
CT
2310
1500
3100
2680
SP-2
SP-1
730
1340
2600
920
3860
2700

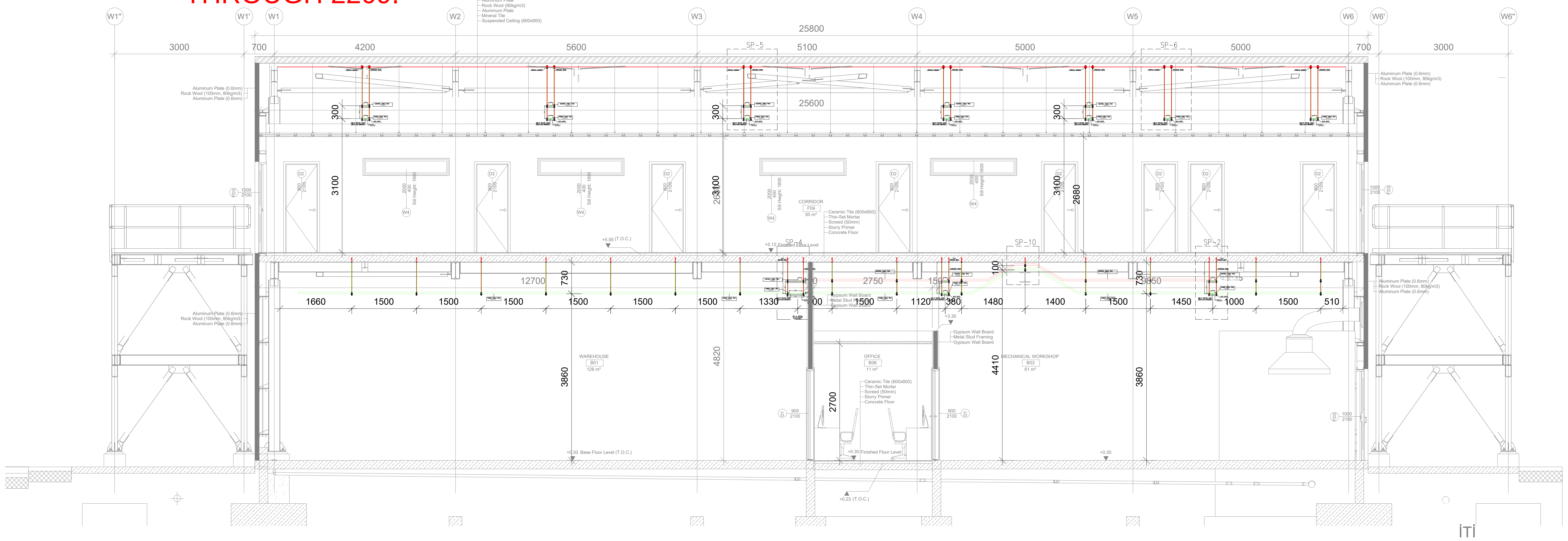
D1 SECTION
SCALE: 1/50


WA
880
700
600
1300
1300
3100
2680
980
1300
1300
1300
3860
2700

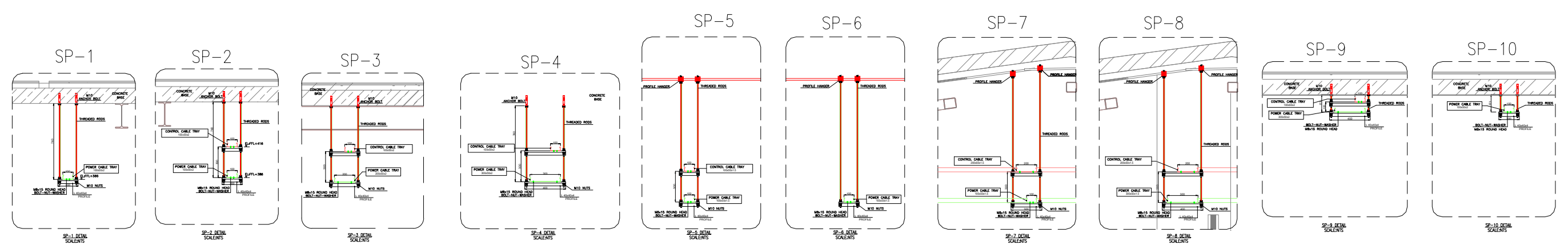
D2 SECTION
SCALE: 1/50

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2206-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY PLAN-1, PLUS -2 , PLUS -3

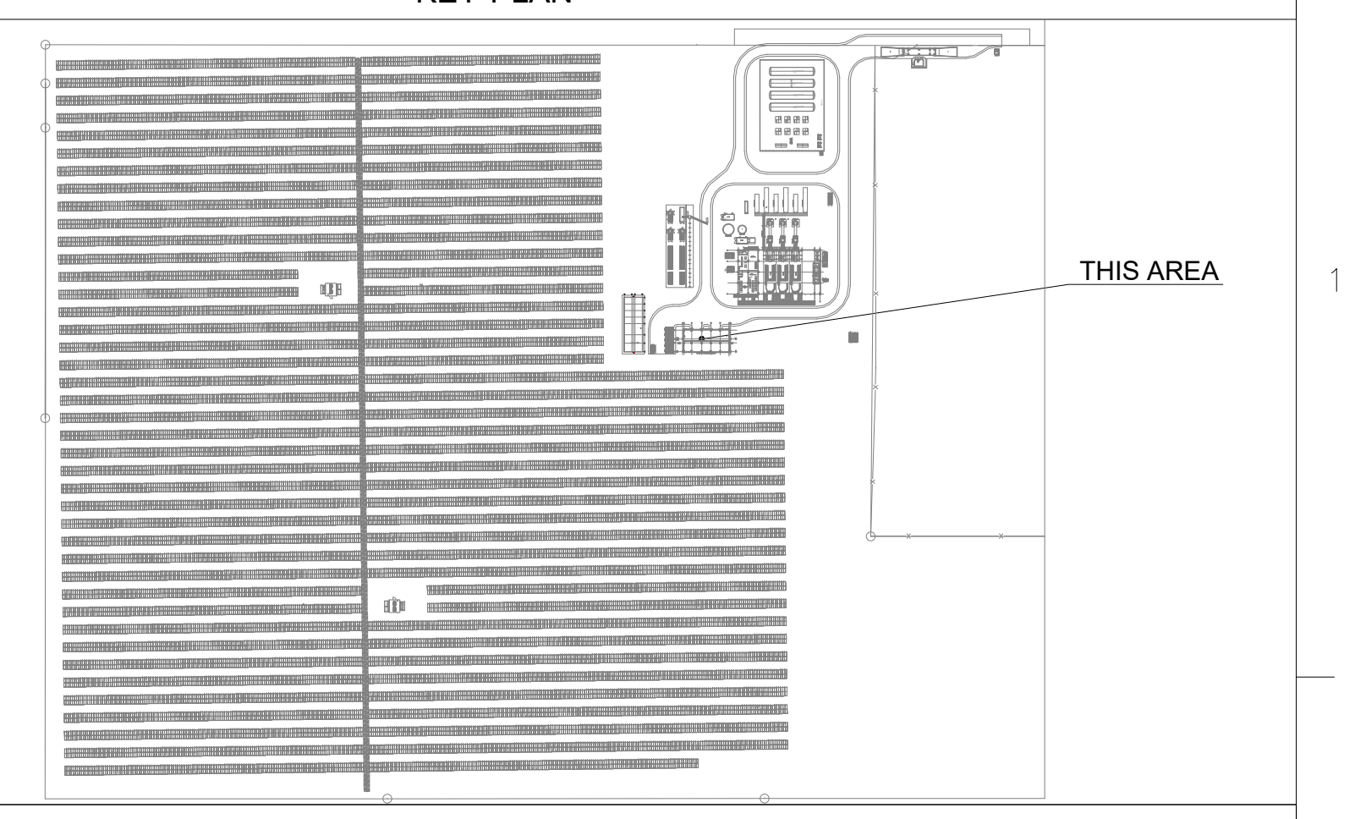
SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.


W1'
W1'
W1
W2
W3
W4
W5
W6
W6'
W6"
25800
3000
700
4200
5600
5100
5000
5000
700
3000
SP-5
SP-6
25600
300
300
300
3100
3100
3100
2680
SP-10
SP-2
12700
730
2750
730
100
1660
1500
1500
1500
1500
1500
1500
1330
1500
1120
360
1480
1400
1500
1450
1000
1500
510
3860
4820
2700
4410
3860
ITI

B-T SECTION
SCALE: 1/50


SP-1
SP-2
SP-3
SP-4
SP-5
SP-6
SP-7
SP-8
SP-9
SP-10

KEY-PLAN



REFERENCE DRAWINGS

LEGEND

SYMBOL LIST	
🟩	High Current Cable Tray
🟥	Low Current Cable Tray
⬠	45° Connection Module
⊤	T Connection Module
✚	4-Way Connection Module

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. **BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS,ARCHITECTURAL DRAWINGS, ... MISMATCHES SHOULD BE INFORMED TO DESIGNER.**
5. **FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING**

MATERIAL NOTES

GENERAL NOTES FOR CABLE TRAYS:

1. LOW CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x10x2mm.
2. HIGH CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x50x2mm - 300x50x2mm
3. ALL PERFORATED CABLE TRAYS, LADDER CABLE TRAYS AND ACCESSORIES (bolts, nuts, washers, joint plate, rods, etc.) SHOULD BE HOT DIP GALVANIZED ACCORDING TO INDOOR C3 AND OUTDOOR C4H CORROSIVITY CLASS.

NOTES

HOLD LISTS

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

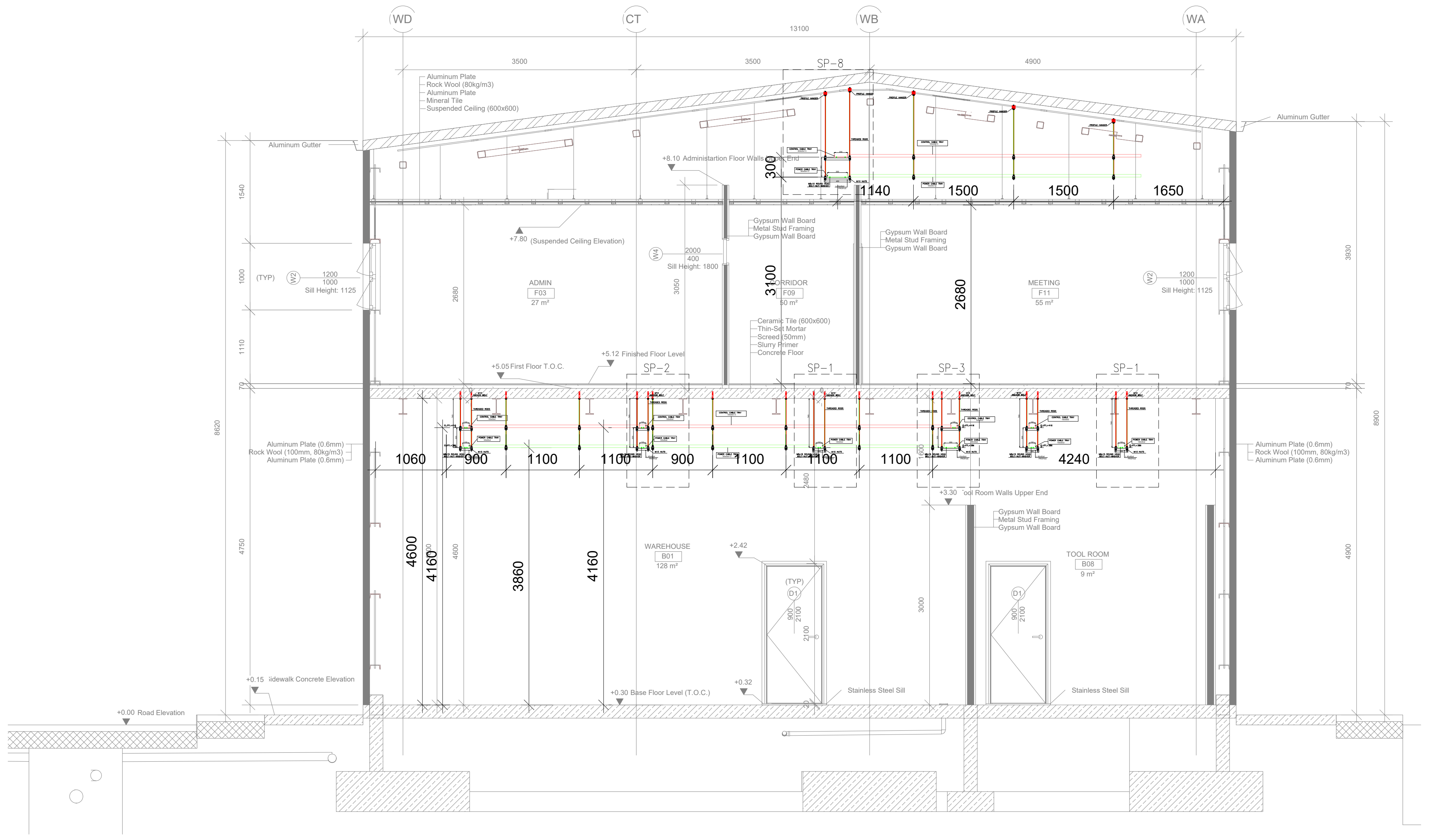
SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

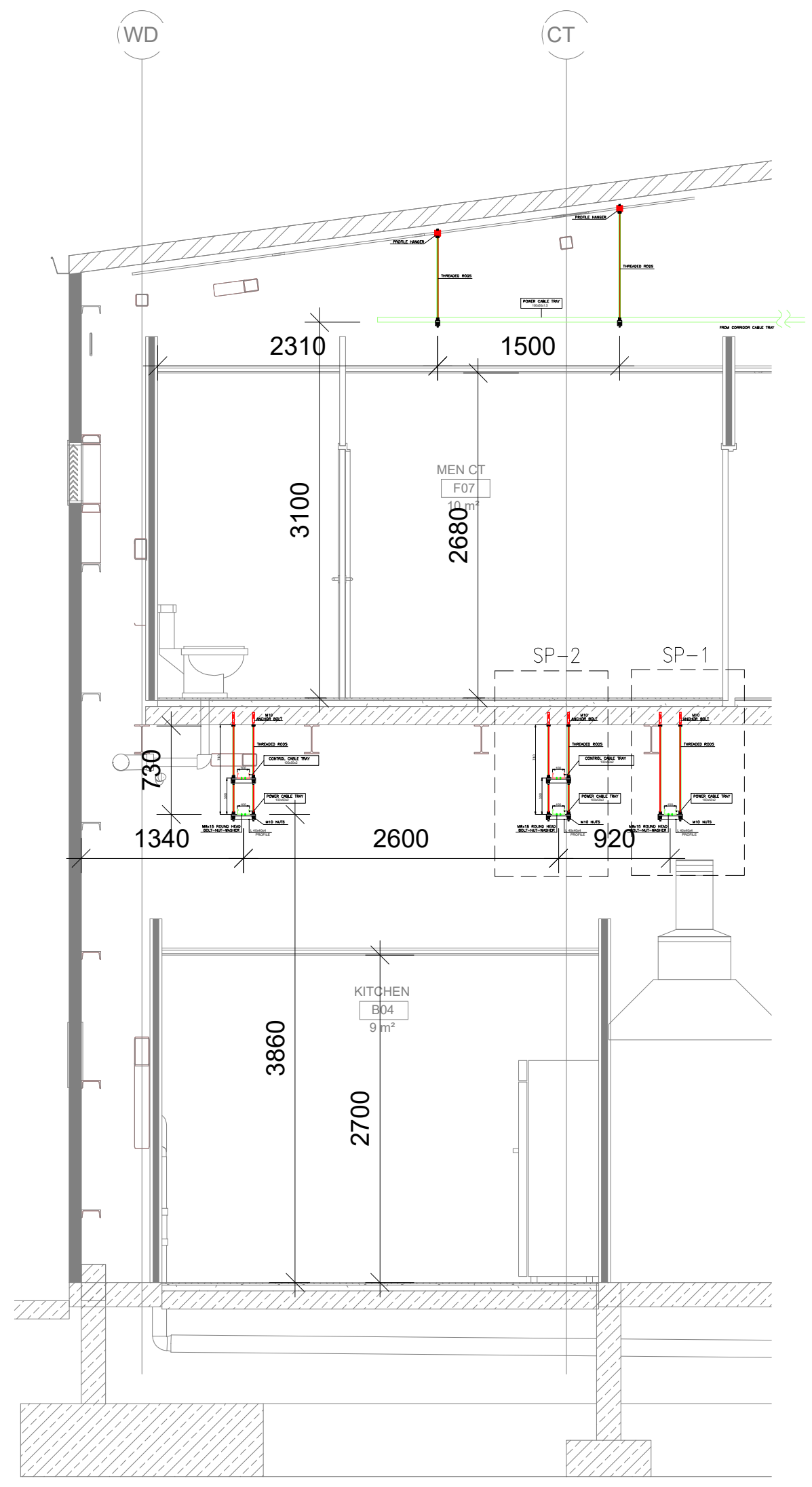
SIZE	SCALE
A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.10.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

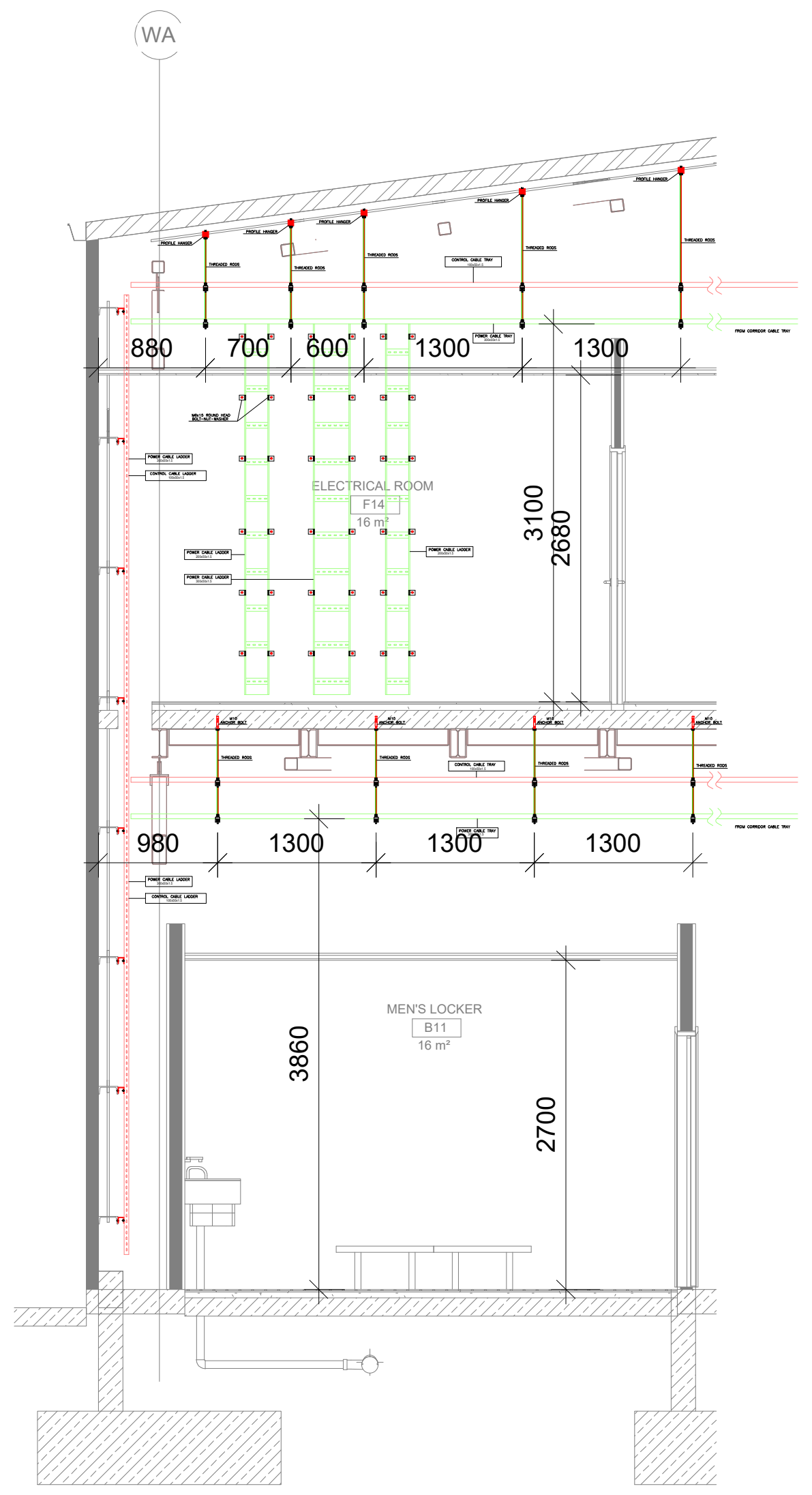
DRAWING NUMBER: ABA-ENG-ELC-DRW-2206
SHEET: 3
OF: 3
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY SECTIONS


WD
CT
WB
WA
SP-8
SP-3
SP-2
SP-1
ADMIN
CORRIDOR
MEETING
WAREHOUSE
TOOL ROOM
1140
1500
1500
1650
1060
900
1100
1100
900
1100
1100
1100
4240
3100
2680
4600
4160
3860
4160
300

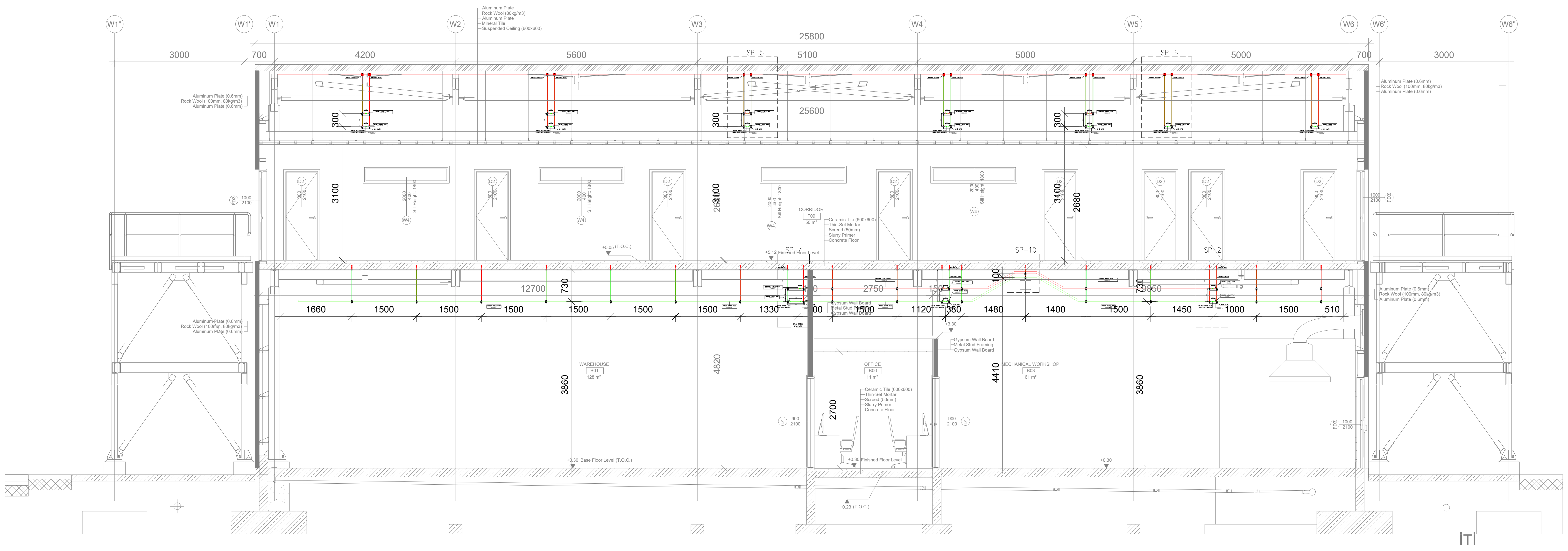
A-T SECTION
SCALE: 1/50


WD
CT
2310
1500
3100
2680
730
1340
2600
920
SP-2
SP-1
KITCHEN
3860
2700

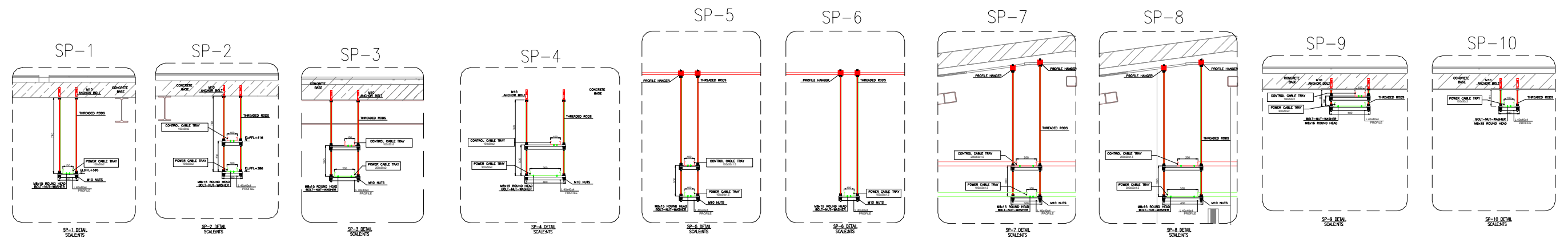
D1 SECTION
SCALE: 1/50


WA
880
700
600
1300
1300
ELECTRICAL ROOM
3100
2680
980
1300
1300
1300
MEN'S LOCKER
3860
2700

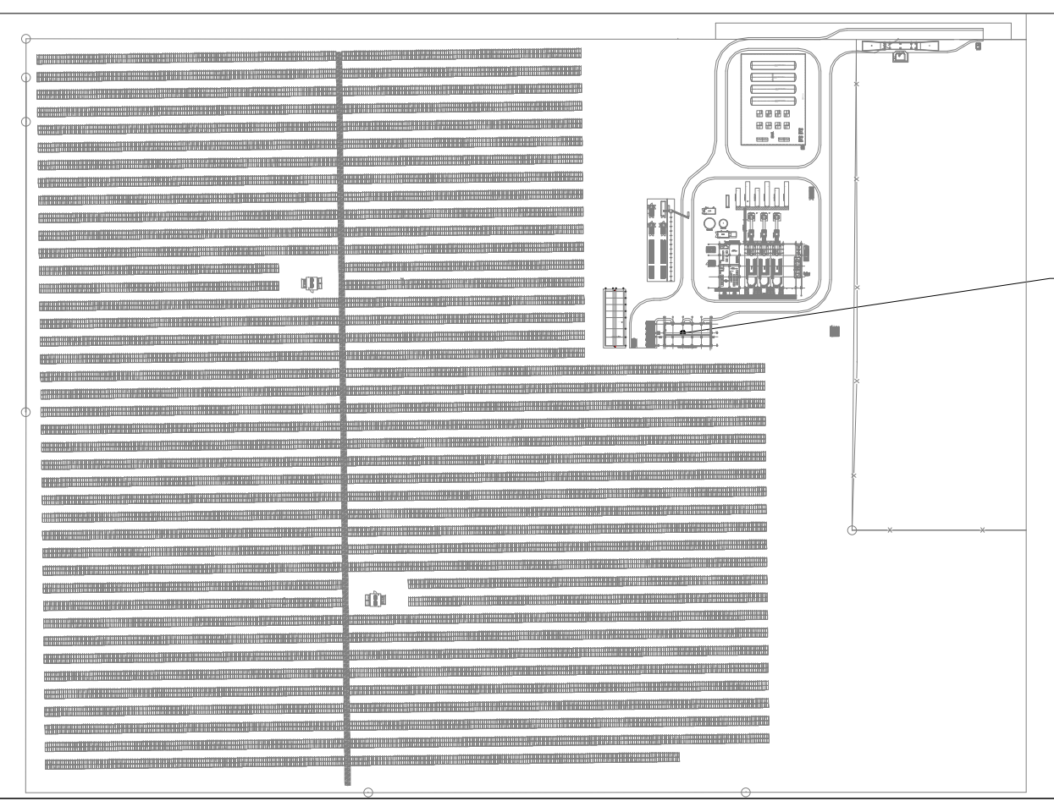
D2 SECTION
SCALE: 1/50


W1"
W1'
W1
W2
W3
W4
W5
W6
W6'
W6"
25800
3000
700
4200
5600
5100
5000
5000
700
3000
SP-5
SP-6
25600
300
300
300
3100
3100
3100
2680
CORRIDOR
SP-10
SP-2
12700
730
2750
730
100
1660
1500
1500
1500
1500
1500
1500
1330
1500
1120
360
1480
1400
1500
1450
1000
1500
510
WAREHOUSE
OFFICE
MECHANICAL WORKSHOP
3860
4820
2700
4410
3860
İTİ

B-T SECTION
SCALE: 1/50


SP-1
SP-2
SP-3
SP-4
SP-5
SP-6
SP-7
SP-8
SP-9
SP-10

KEY-PLAN



REFERENCE DRAWINGS

LEGEND

SYMBOL LIST	
🟩	High Current Cable Tray
🟥	Low Current Cable Tray
	45° Connection Module
	T Connection Module
	4-Way Connection Module

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. **BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS,ARCHITECTURAL DRAWINGS, ... MISMATCHES SHOULD BE INFORMED TO DESIGNER.**
5. **FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER.**
DO NOT MEASURE ANY DIMENSION FROM DRAWING

MATERIAL NOTES

GENERAL NOTES FOR CABLE TRAYS:

1. LOW CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x10x2mm.
2. HIGH CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x50x2mm - 300x50x2mm
3. ALL PERFORATED CABLE TRAYS, LADDER CABLE TRAYS AND ACCESSORIES (bolts, nuts, washers, joint plate, rods, etc.) SHOULD BE HOT DIP GALVANIZED ACCORDING TO INDOOR C3 AND OUTDOOR C4H CORROSIVITY CLASS.

NOTES

HOLD LISTS

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
A0	1/1

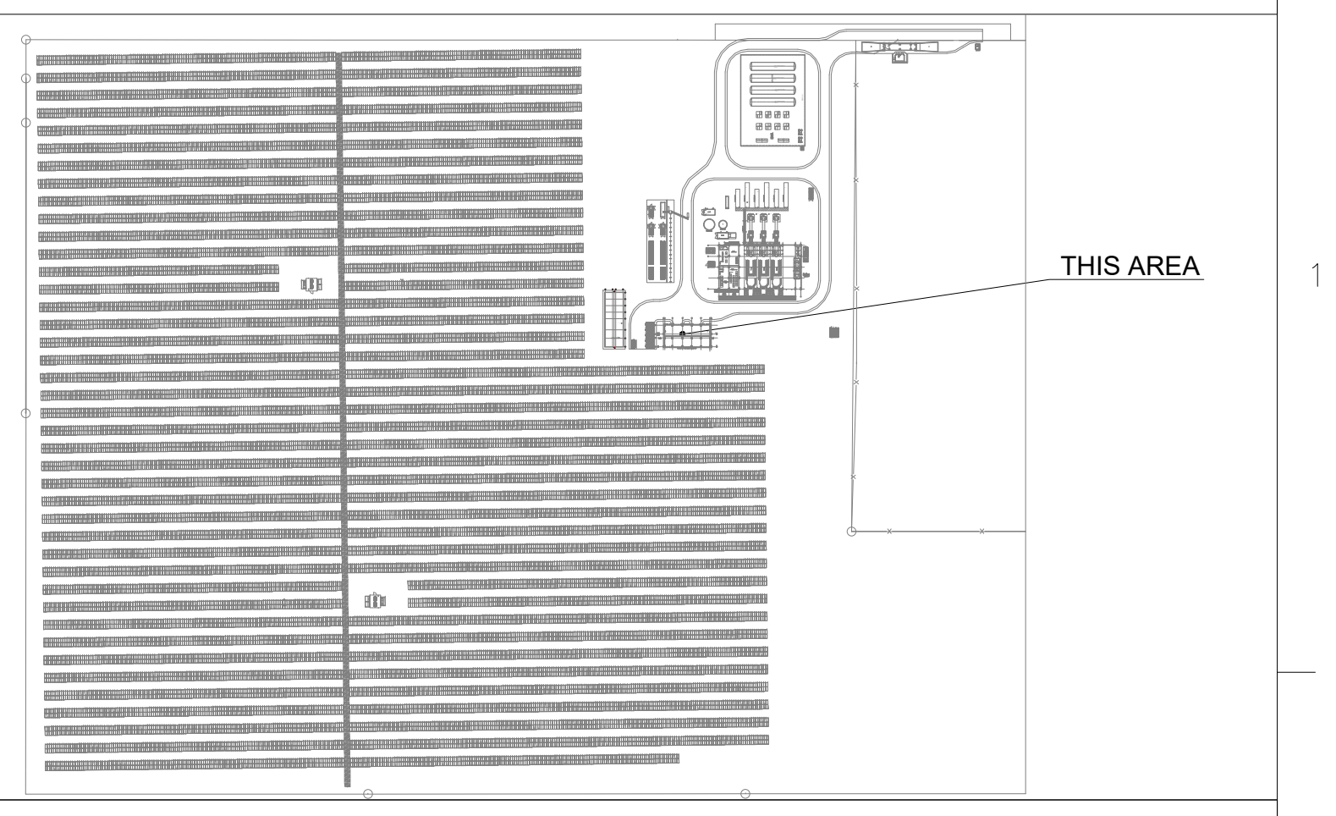
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.10.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

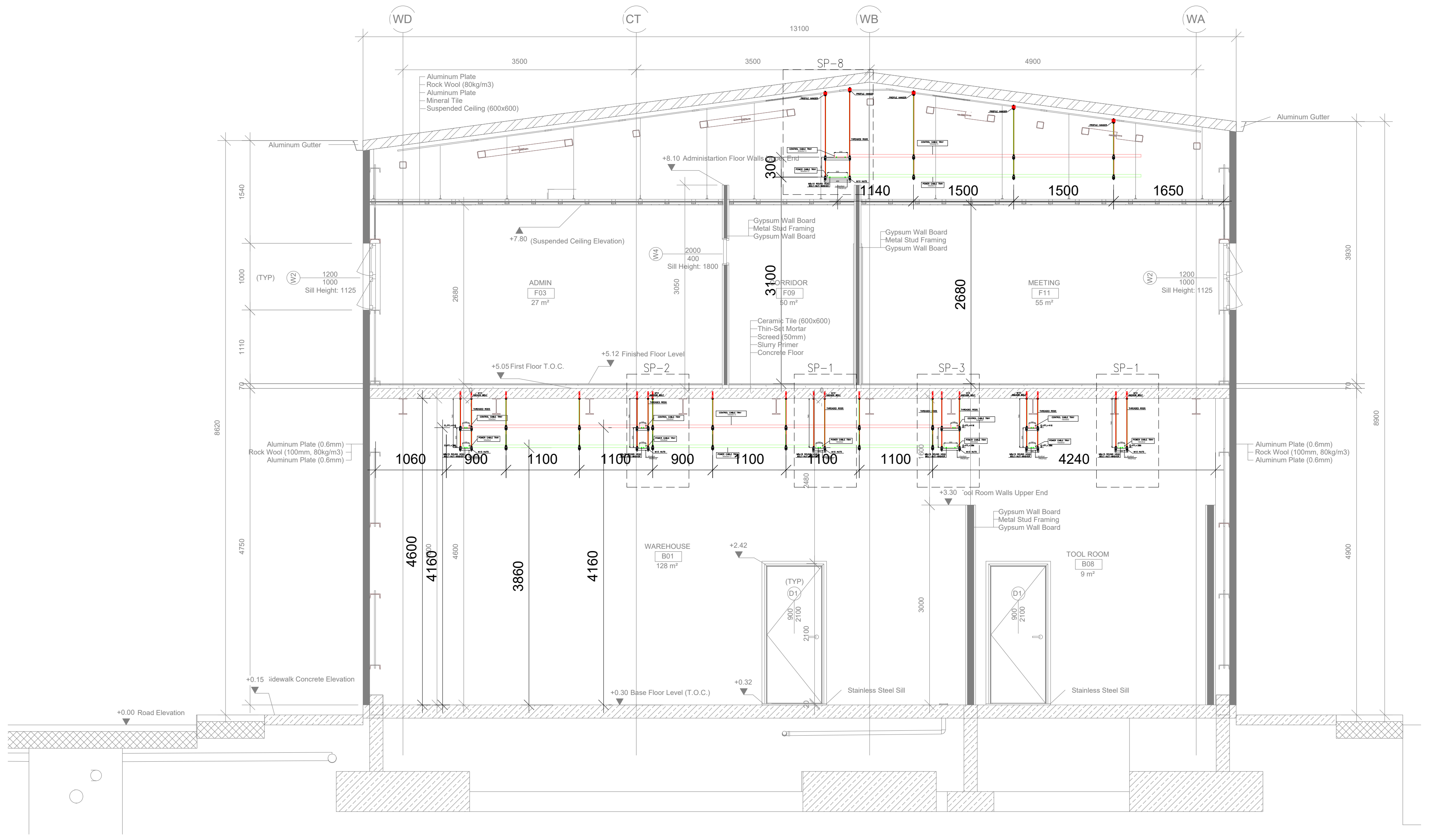
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2206

SHEET: 3
OF: 3

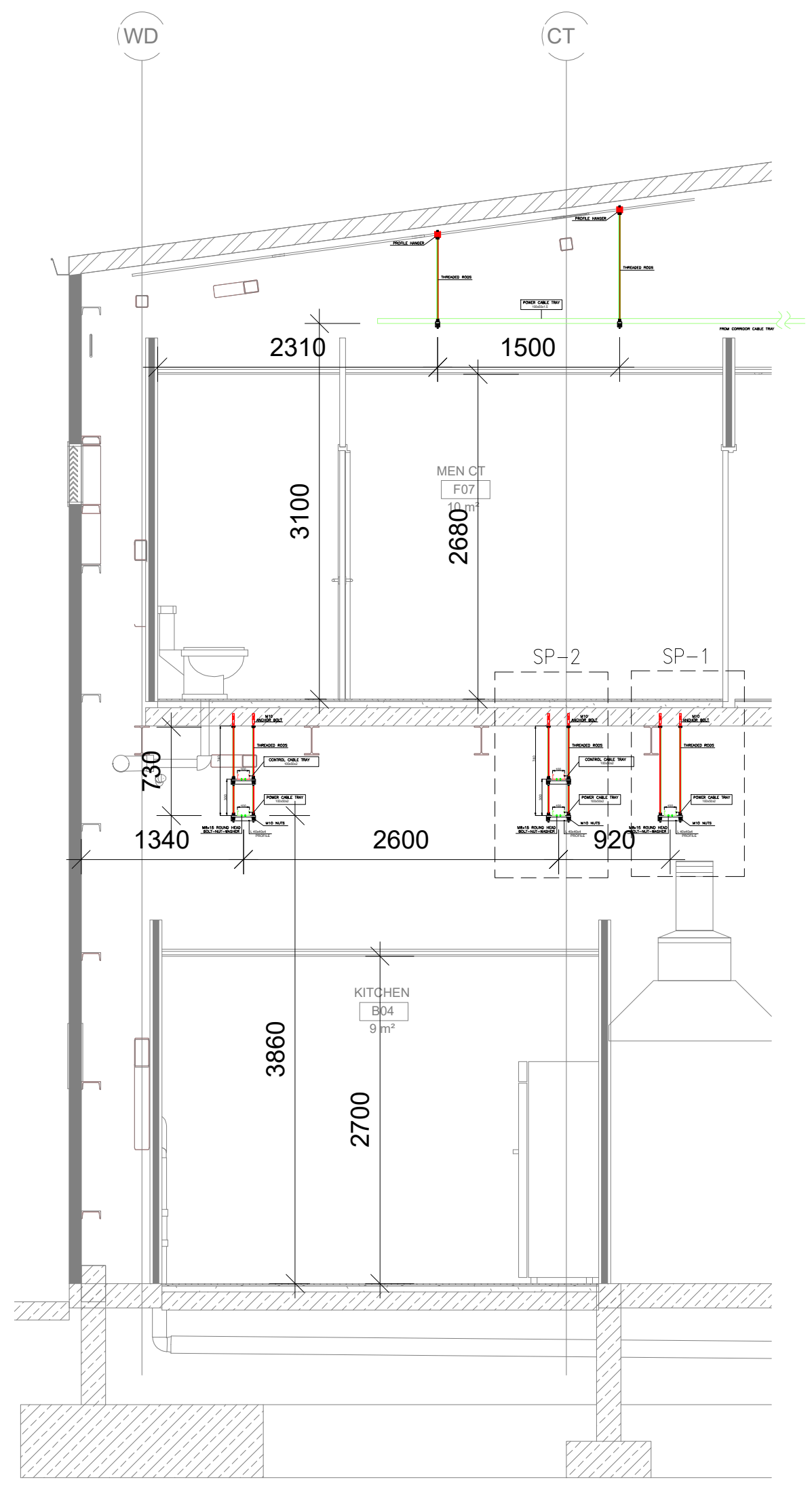
DRAWING NAME:
ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING
CABLE TRAY SECTIONS

KEY-PLAN

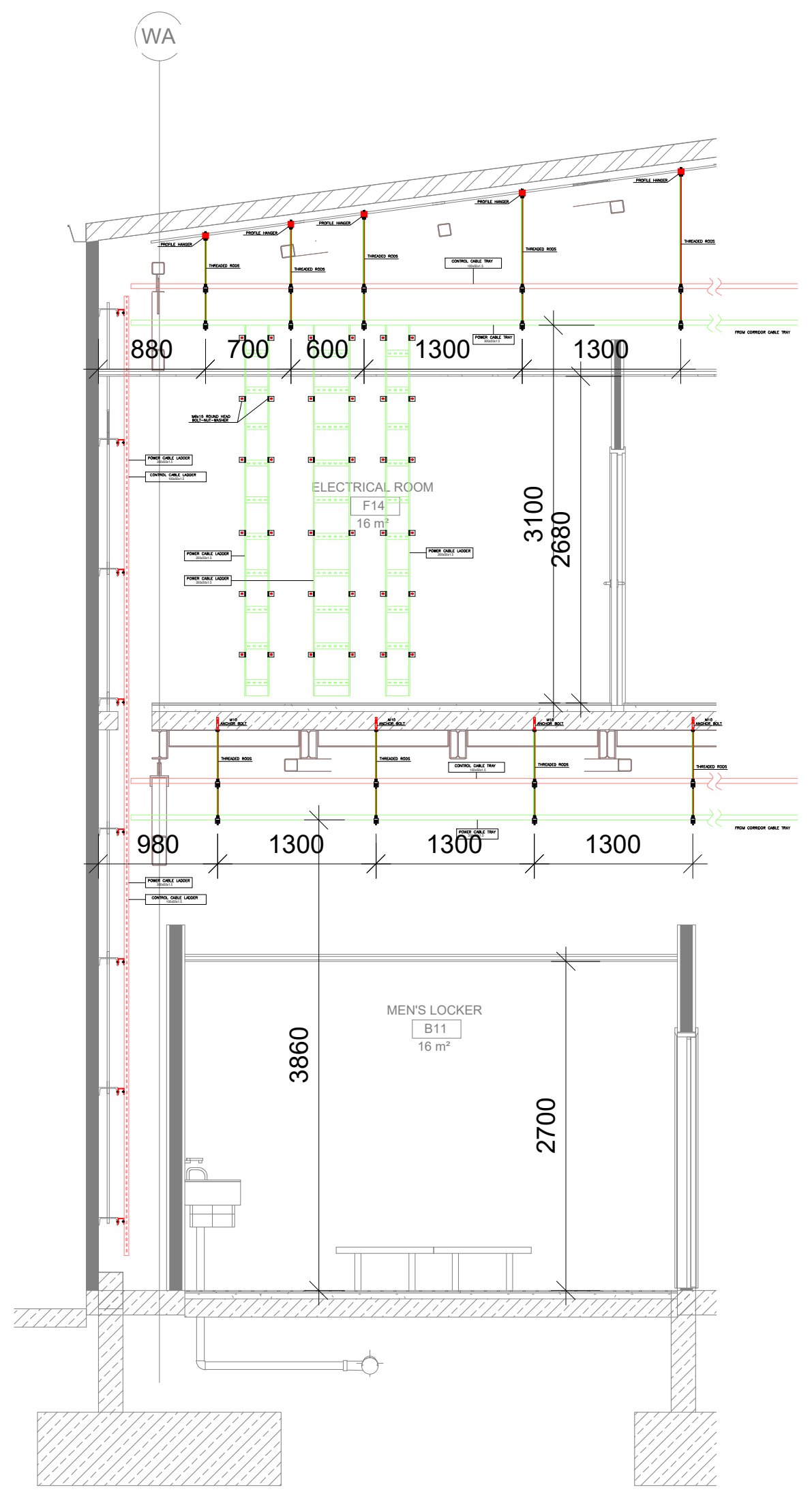



WD
CT
WB
WA
SP-8
SP-2
SP-3
SP-1
300
1140
1500
1500
1650
3100
2680
1060
900
1100
1100
900
1100
1100
1100
4240
4600
4160
3860
4160

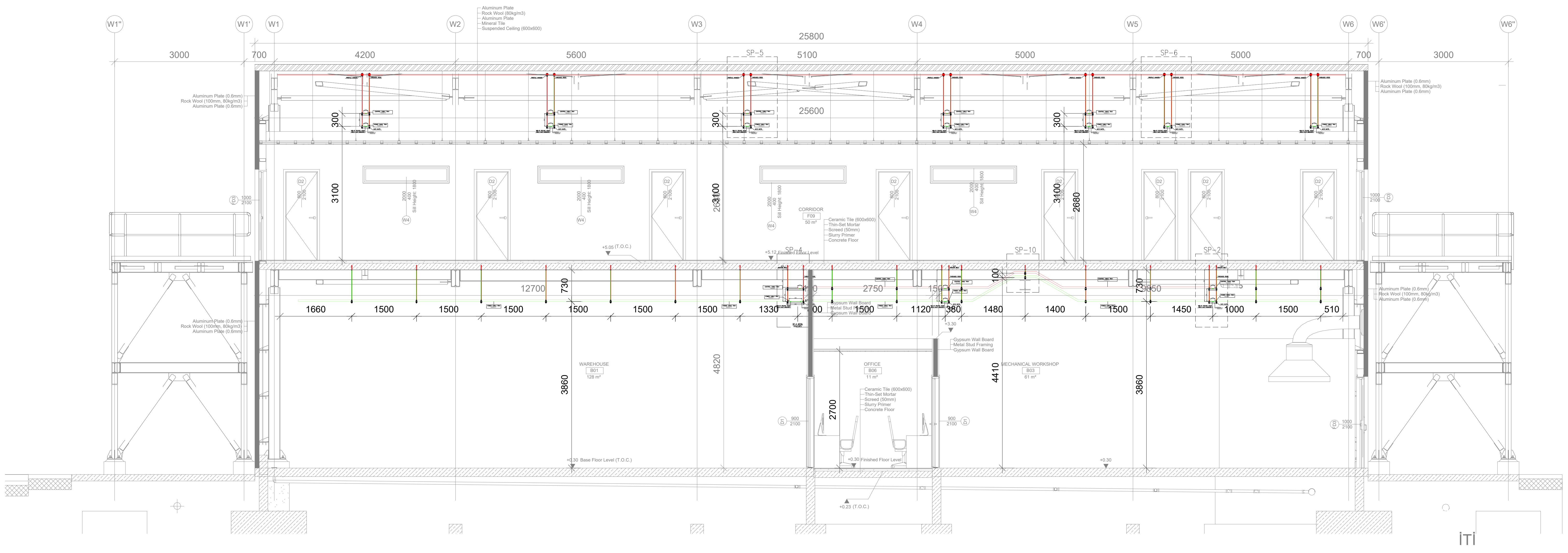
A-T SECTION
SCALE: 1/50


WD
CT
2310
1500
3100
2680
730
1340
2600
920
SP-2
SP-1
3860
2700

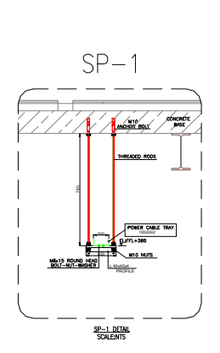
D1 SECTION
SCALE: 1/50

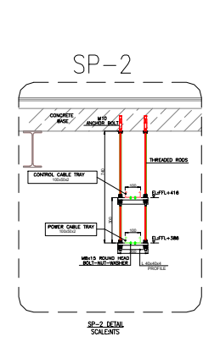

WA
880
700
600
1300
1300
3100
2680
980
1300
1300
1300
3860
2700

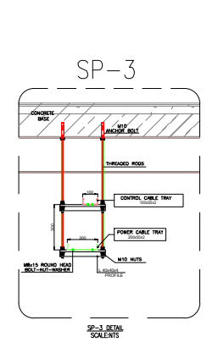
D2 SECTION
SCALE: 1/50

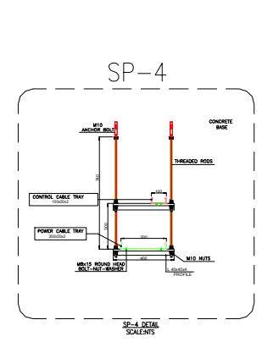

W1°
W1'
W1
W2
W3
W4
W5
W6
W6'
W6°
25800
3000
700
4200
5600
5100
5000
5000
700
3000
SP-5
SP-6
25600
300
300
300
3100
3100
3100
2680
12700
730
2750
730
100
SP-10
SP-2
1660
1500
1500
1500
1500
1500
1500
1330
1500
1120
360
1480
1400
1500
1450
1000
1500
510
3860
4820
2700
4410
3860
İTİ

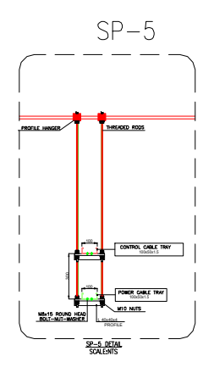
B-T SECTION
SCALE: 1/50

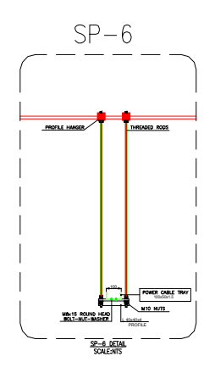


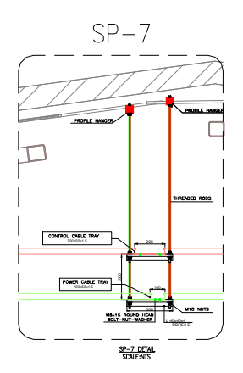


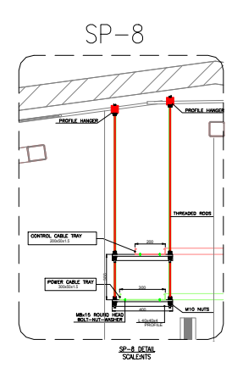


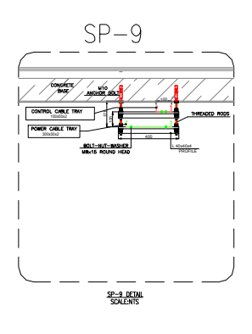


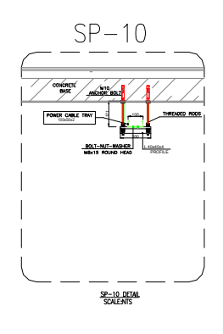












REFERENCE DRAWINGS

LEGEND

SYMBOL LIST	
▭	High Current Cable Tray
▭	Low Current Cable Tray
	45° Connection Module
	T Connection Module
	4-Way Connection Module

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. **BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS, ELECTRICAL DRAWINGS,ARCHITECTURAL DRAWINGS, ... MISMATCHES SHOULD BE INFORMED TO DESIGNER.**
5. **FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING**

MATERIAL NOTES

GENERAL NOTES FOR CABLE TRAYS:

1. LOW CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x10x2mm.
2. HIGH CURRENT CABLE TRAYS WILL BE 100x50x2mm AND 200x50x2mm - 300x50x2mm
3. ALL PERFORATED CABLE TRAYS, LADDER CABLE TRAYS AND ACCESSORIES (bolts, nuts, washers, joint plate, rods, etc.) SHOULD BE HOT DIP GALVANIZED ACCORDING TO INDOOR C3 AND OUTDOOR C4H CORROSIVITY CLASS.

NOTES

HOLD LISTS

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

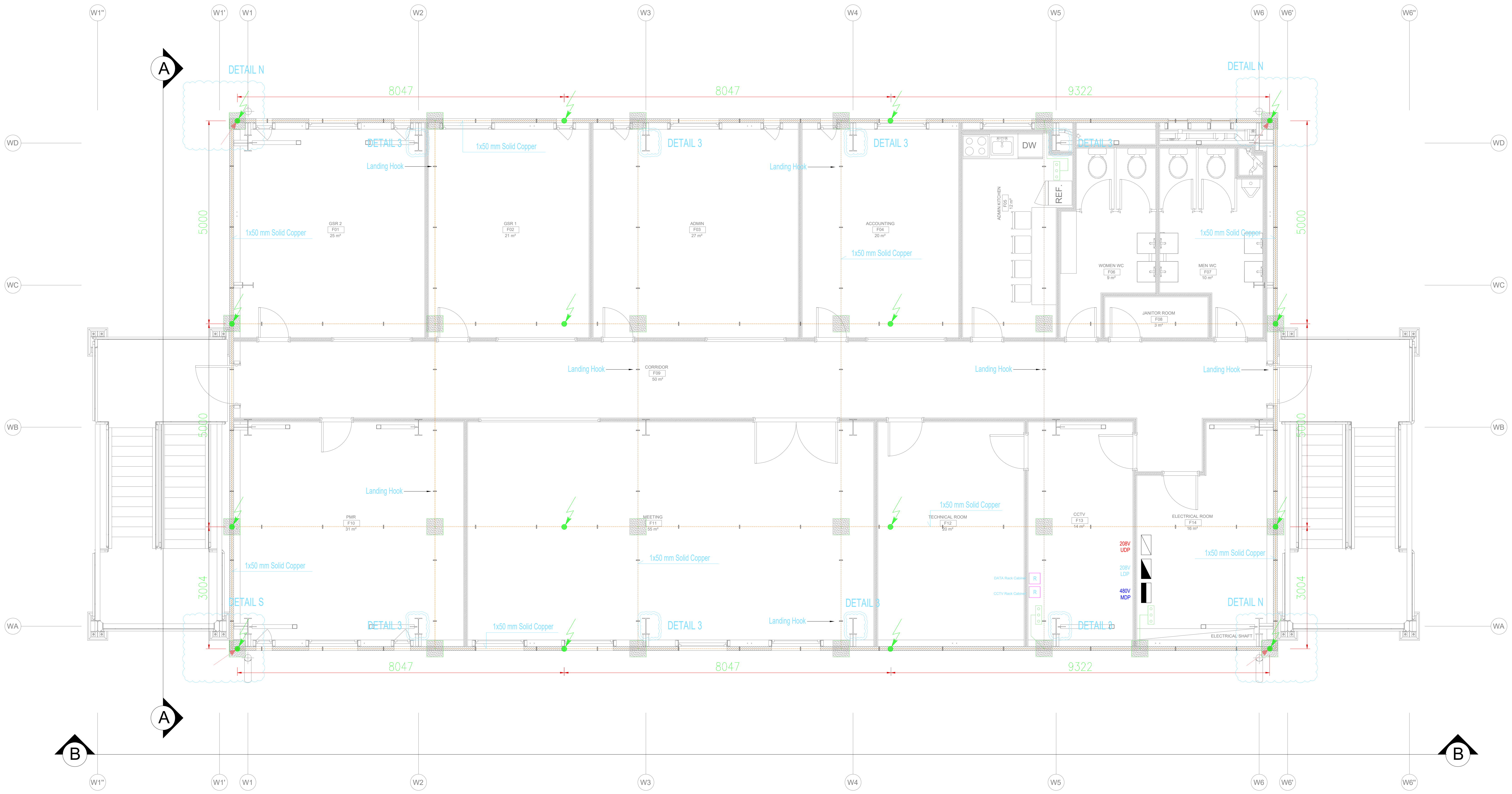
ISSUE OWNER

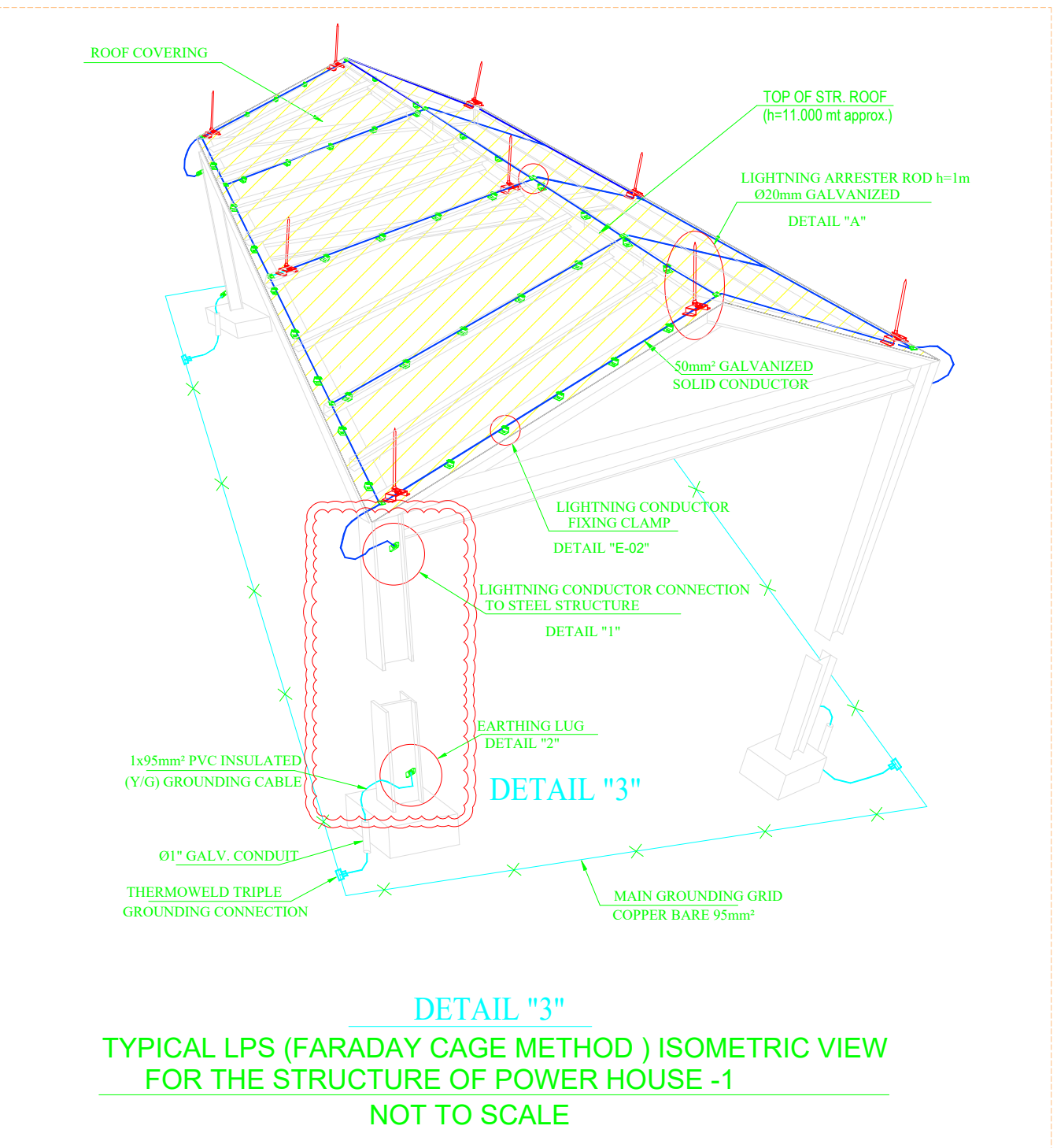
SIZE	SCALE
A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.10.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

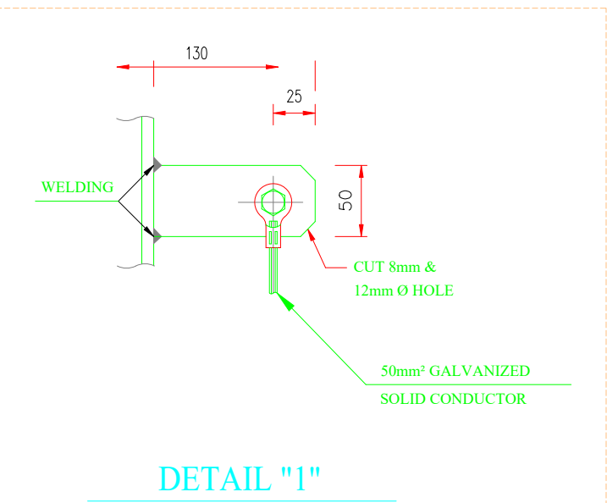
DRAWING NUMBER: ABA-ENG-ELC-DRW-2206
SHEET: 3
OF: 3
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING CABLE TRAY SECTIONS

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2208-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTING PLAN-1, PLUS -2, PLUS -3, PLUS -4
SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.

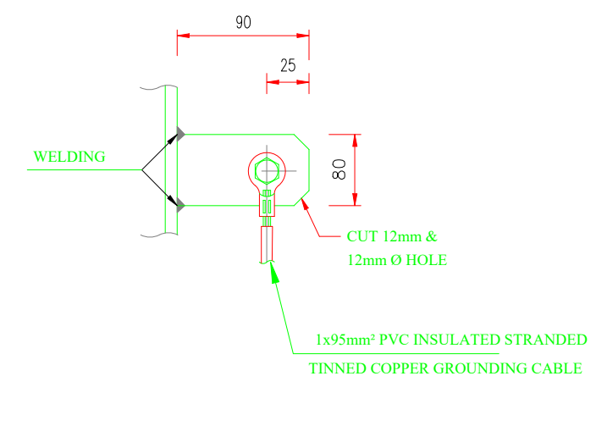

W1'
W1''
W1
W2
W3
W4
W5
W6
W6'
W6''
WD
WC
WB
WA
A
B
DETAIL N
DETAIL S
DETAIL 3
8047
9322
5000
3304
1x50 mm Solid Copper
Landing Hook
GSR 2
GSR 1
ADMIN
ACCOUNTING
DW
REF.
WOMEN WC
MEN WC
JANITOR ROOM
CORRIDOR
PMR
MEETING
TECHNICAL ROOM
CCTV
ELECTRICAL ROOM
ELECTRICAL SHAFT
208V UDP
480V MDP


ROOF COVERING
TOP OF STR. ROOF (h=11.000 mt approx.)
LIGHTNING ARRESTER ROD h=1m Ø20mm GALVANIZED
DETAIL "A"
50mm² GALVANIZED SOLID CONDUCTOR
LIGHTNING CONDUCTOR FIXING CLAMP
DETAIL "E-02"
LIGHTNING CONDUCTOR CONNECTION TO STEEL STRUCTURE
DETAIL "1"
EARTHING LUG
DETAIL "2"
1x95mm² PVC INSULATED (Y/G) GROUNDING CABLE
Ø1" GALV. CONDUIT
THERMOWELD TRIPLE GROUNDING CONNECTION
MAIN GROUNDING GRID COPPER BARE 95mm²
DETAIL "3"

DETAIL "3"
TYPICAL LPS (FARADAY CAGE METHOD) ISOMETRIC VIEW FOR THE STRUCTURE OF POWER HOUSE -1
NOT TO SCALE

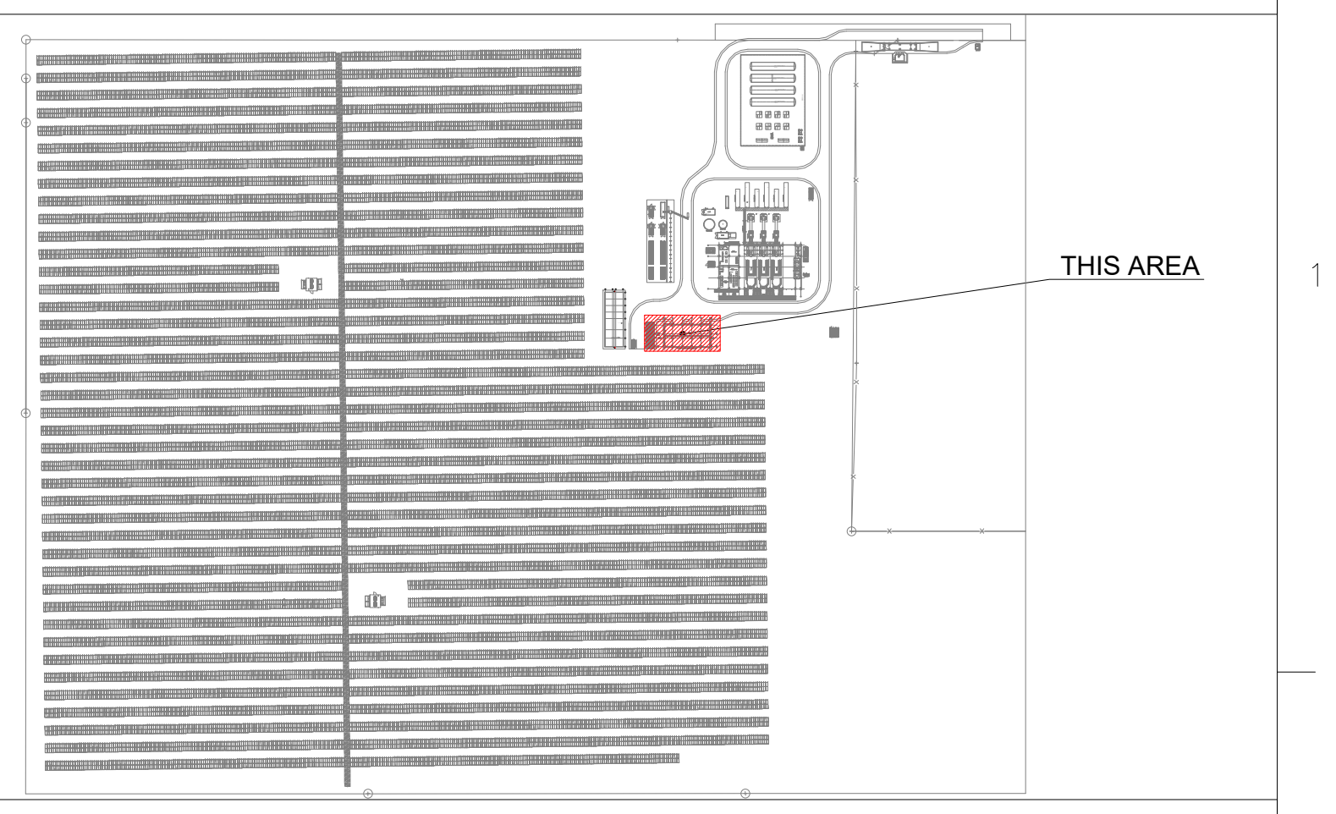

130
25
50
WELDING
CUT 8mm & 12mm Ø HOLE
50mm² GALVANIZED SOLID CONDUCTOR

DETAIL "1"
LPS CONDUCTOR CONNECTION TO EARTHING LUG


90
25
80
WELDING
CUT 12mm & 12mm Ø HOLE
1x95mm² PVC INSULATED STRANDED TINNED COPPER GROUNDING CABLE

DETAIL "2"
STEEL STRUCTURE GROUNDING

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2207 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS
ABA-ENG-ELC-SPE-2208 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION SPECIFICATION
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

SYMBOL LIST	
ϟ	Q20 mm 100 cm Stainless Steel Capture Tip
○○○	Equipotential Busbars tinned - cooppers will have 3 holes.
▬	30x3,5 mm Galvanized Strip Conductor
▪▪▪▪▪	1x95mm² Stranded Bare Copper Conductor
-------	1x50 mm Solid Copper
●	Cadvelt source
■	Galvanized Steel Bolted Connector
⏚	L:3m Q=20 mm Electroltyte Copper Grounding Rod
□	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
10. ALL STEEL COLUMNS WILL BE CONNECTED BY CHECKED AT CERTAIN POINTS FOR CONDUCTIVITY CONTINUITY. ALL STEEL ELEMENTS, EXCEPT THE BUILDING'S MAIN STEEL COLUMNS, PLATFORM-BEARING COLUMNS, STEEL PLATFORMS, EQUIPMENT-BEARING PLATFORMS (ETC.), WILL BE CONNECTED TO THE GROUNDING SYSTEM.
11. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
12. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
13. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
14. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
15. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
16. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
17. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.
18. GROUNDING BARS USED ON THE SURFACE. STAINLESS STEEL BOLTS WILL BE USED.
19. EQUIPOTENTIAL BUSBARS WILL HAVE 3 HOLES.
20. BEFORE COMMISIONING CONTINUTY AND FALL-OF POTENTIAL TESTS SHALL BE CONDCUTED.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY → POSITIVE ENERGY

DESIGNER
n22

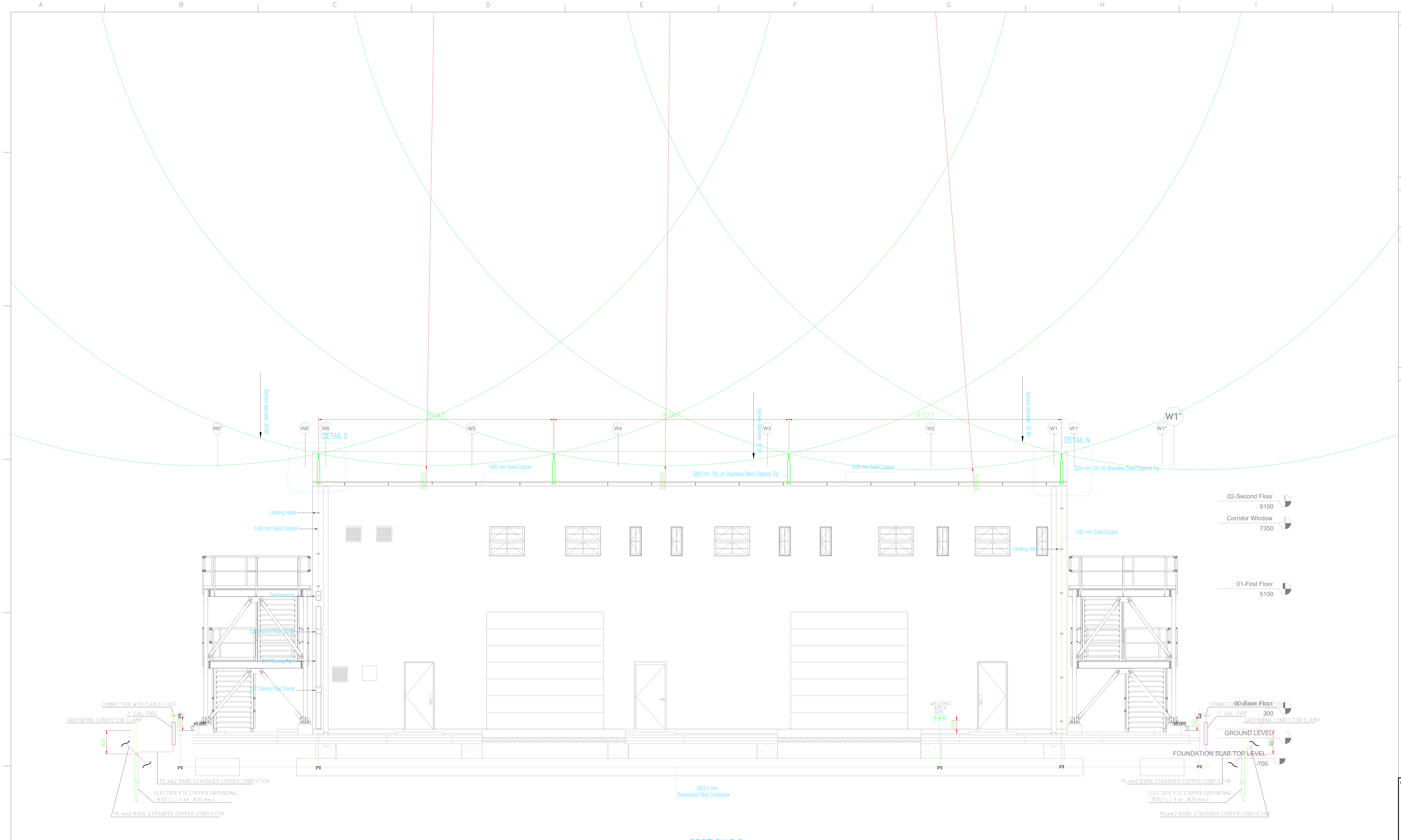
SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

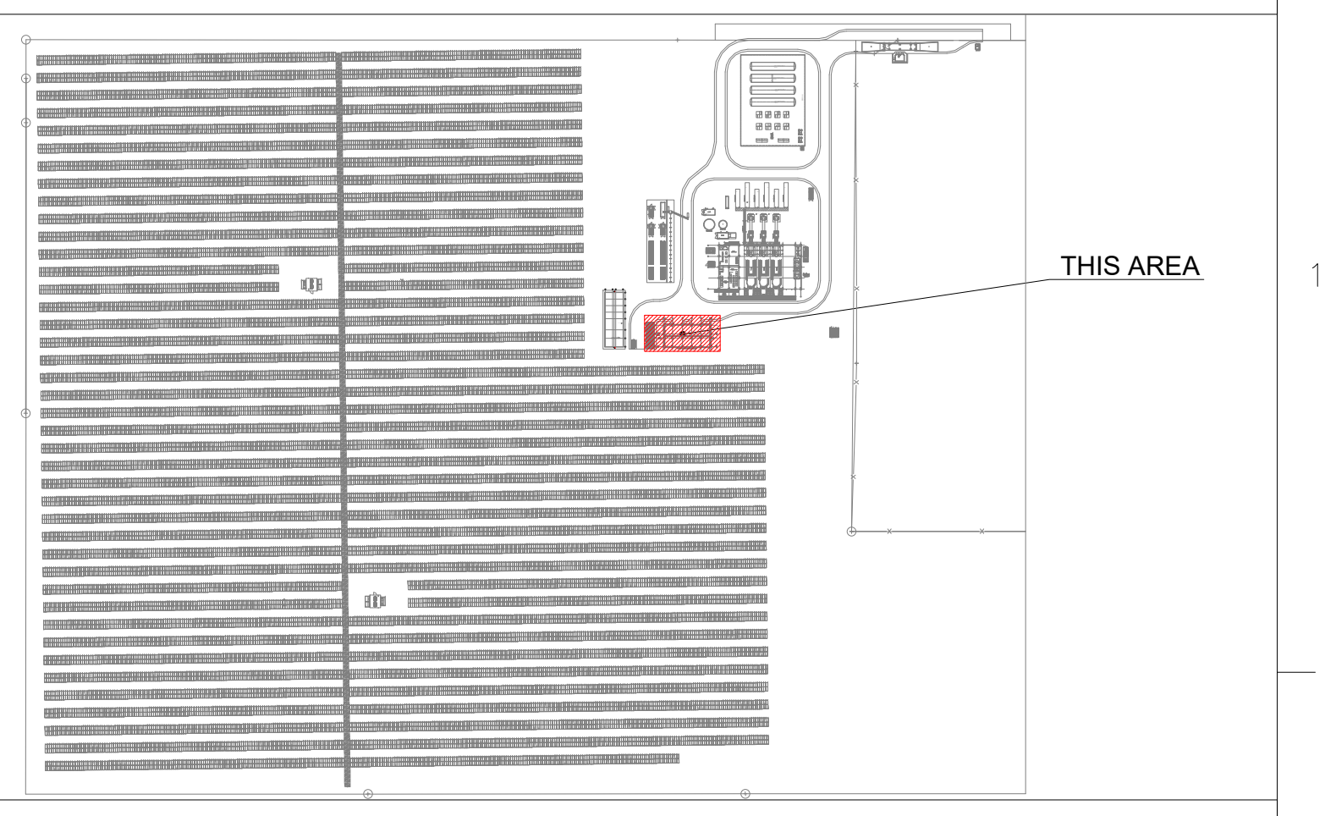
SIZE: A0
SCALE: 1/50

DRAWING NUMBER: ABA-ENG-ELC-DRW-2208
SHEET: 1
OF: 4
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION PLAN


Sphere diameter: 20 Mt
W6''
W6'
W6
DETAIL S
8047
W5
1x50 mm Solid Copper
W4
8047
R20000
Q20 mm 100 cm Stainless Steel Capture Tip
Sphere diameter: 20 Mt
W3
1x50 mm Solid Copper
9322
W2
W1
W1'
DETAIL N
W1''
W1''
Q20 mm 100 cm Stainless Steel Capture Tip
Landing Hook
1x50 mm Solid Copper
Test terminal
3/4" Casing Pipe Clamp
3/4" Casing Pipe
3/4" Casing Pipe Clamp
CONNECTION WITH CABLE LUGS
1'' GAL. PIPE
GROUNDING CONDUCTOR CLAMP
800
500
±0.000
95 mm2 BARE STRANDED COPPER CONDUCTOR
ELECTROLYTE COPPER GROUNDING ROD (L= 3 mt, Ø20 mm)
95 mm2 BARE STRANDED COPPER CONDUCTOR
30x3,5 mm Galvanized Strip Conductor
WELDING AREA B05
300
1x50 mm Solid Copper
Landing Hook
02-Second Floor
8100
Corridor Window
7350
01-First Floor
5100
00-Base Floor
300
GROUND LEVEL
0
FOUNDATION SLAB TOP LEVEL
-700

SECTION B-B

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2207 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS
ABA-ENG-ELC-SPE-2208 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION SPECIFICATION
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

SYMBOL LIST	
↯	Q20 mm 100 cm Stainless Steel Capture Tip
○ ○ ○	Equipotential Busbars tinned - cooppers will have 3 holes.
▬	30x3,5 mm Galvanized Strip Conductor
▪▪▪▪▪▪	1x95mm² Stranded Bare Copper Conductor
-------	1x50 mm Solid Copper
●	Cadvelt source
■	Galvanized Steel Bolted Connector
≡	L:3m Q=20 mm Electroltyte Copper Grounding Rod
□	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
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11. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
12. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
13. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
14. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
15. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
16. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
17. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.
18. GROUNDING BARS USED ON THE SURFACE. STAINLESS STEEL BOLTS WILL BE USED.
19. EQUIPOTENTIAL BUSBARS WILL HAVE 3 HOLES.
20. BEFORE COMMISIONING CONTINUTY AND FALL-OF POTENTIAL TESTS SHALL BE CONDCUTED.

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY → POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

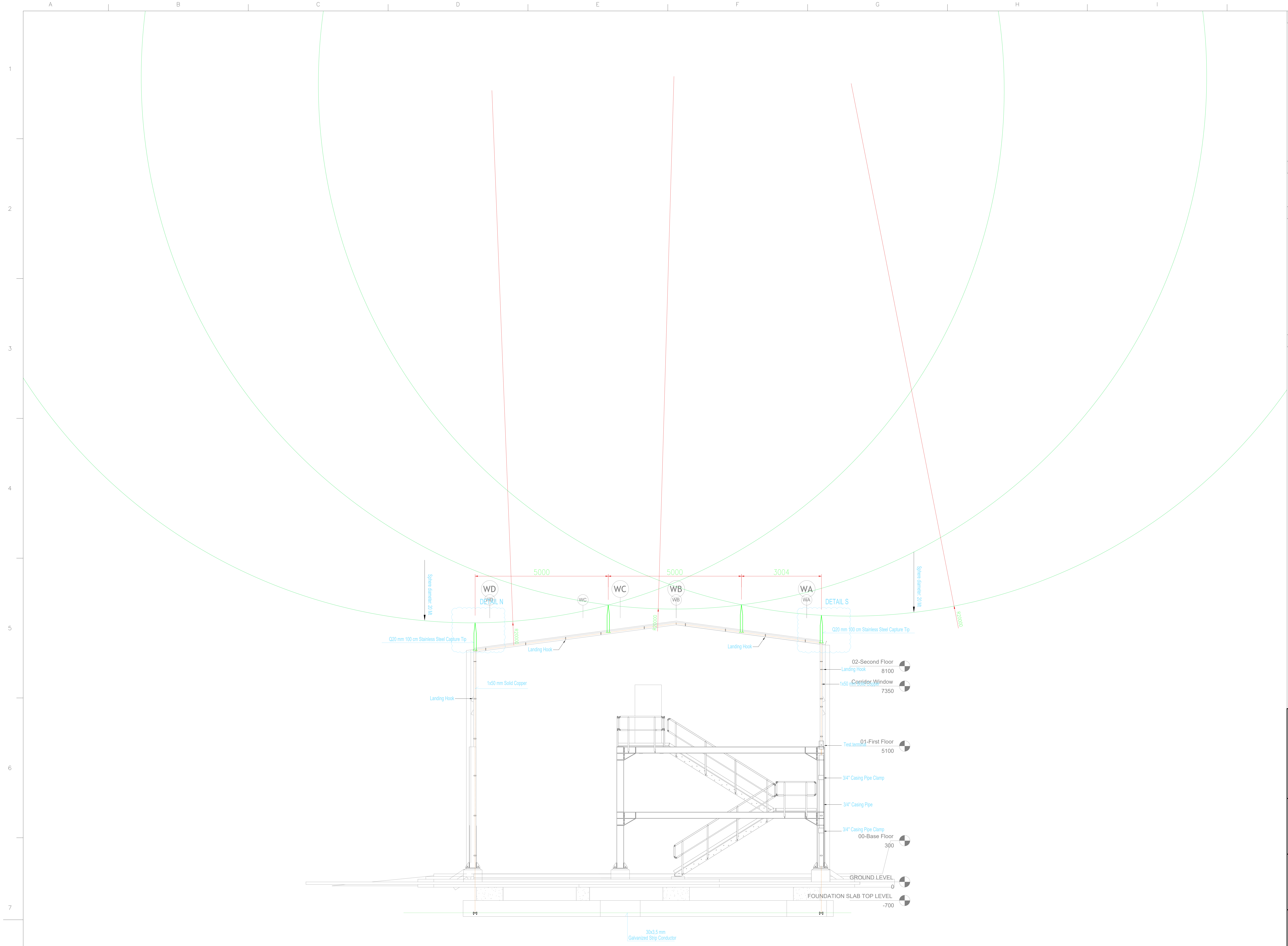
ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
A0	1/50	1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
		0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2208

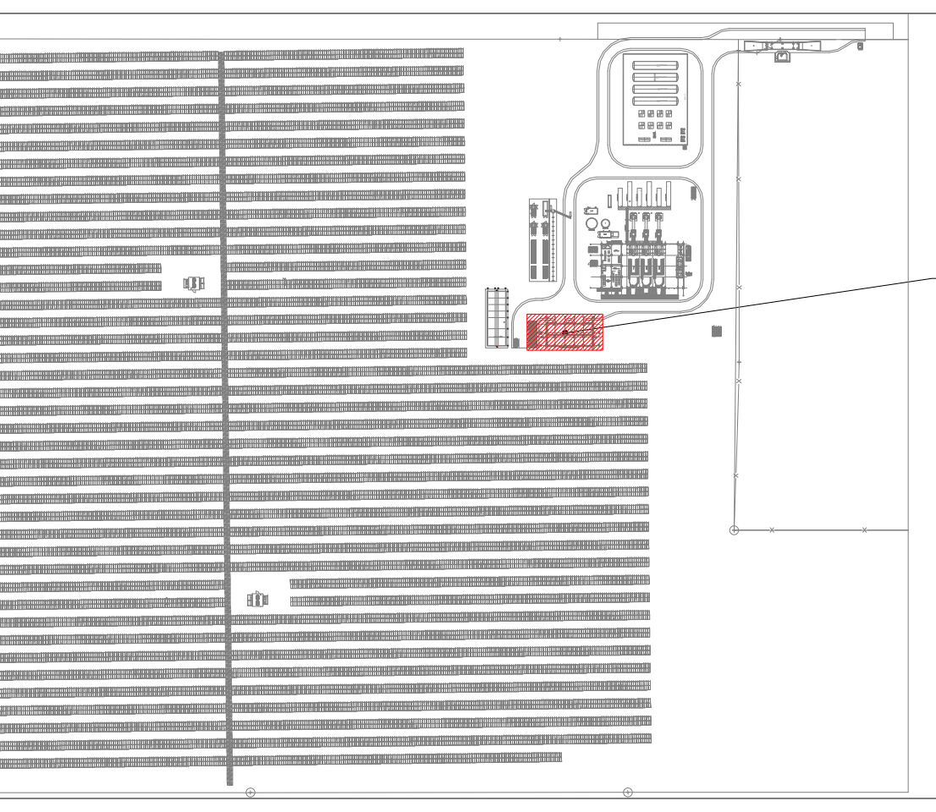
SHEET:
2
OF:
4

DRAWING NAME:
ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING
LIGHTNING PROTECTION SECTION PLAN


5000
5000
3004
WD
WC
WB
WA
WD
WC
WB
WA
DETAIL N
DETAIL S
Sphere diameter: 20 Mt
Sphere diameter: 20 Mt
R20000
R20000
R20000
R20000
Q20 mm 100 cm Stainless Steel Capture Tip
Q20 mm 100 cm Stainless Steel Capture Tip
Landing Hook
Landing Hook
Landing Hook
Landing Hook
1x50 mm Solid Copper
1x50 mm Solid Copper
02-Second Floor
8100
Corridor Window
7350
Test terminal
01-First Floor
5100
3/4" Casing Pipe Clamp
3/4" Casing Pipe
3/4" Casing Pipe Clamp
00-Base Floor
300
GROUND LEVEL
0
FOUNDATION SLAB TOP LEVEL
-700
30x3,5 mm Galvanized Strip Conductor

SECTION A-A

KEY-PLAN



REFERENCE DRAWINGS

ABA-ENG-ELC-DRW-2207 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING FOUNDATION GROUNDING PLANS
ABA-ENG-ELC-SPE-2208 ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION SPECIFICATION
ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

SYMBOL LIST	
↯	Q20 mm 100 cm Stainless Steel Capture Tip
○ ○ ○	Equipotential Busbars tinned - cooppers will have 3 holes.
▬	30x3,5 mm Galvanized Strip Conductor
▪▪▪▪▪▪▪▪▪▪	1x95mm² Stranded Bare Copper Conductor
--------	1x50 mm Solid Copper
●	Cadvelt source
■	Galvanized Steel Bolted Connector
≡	L:3m Q=20 mm Electroltyte Copper Grounding Rod
□	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
10. ALL STEEL COLUMNS WILL BE CONNECTED BY CHECKED AT CERTAIN POINTS FOR CONDUCTIVITY CONTINUITY. ALL STEEL ELEMENTS, EXCEPT THE BUILDING'S MAIN STEEL COLUMNS, PLATFORM-BEARING COLUMNS, STEEL PLATFORMS, EQUIPMENT-BEARING PLATFORMS (ETC.), WILL BE CONNECTED TO THE GROUNDING SYSTEM.
11. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
12. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
13. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
14. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
15. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
16. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
17. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.
18. GROUNDING BARS USED ON THE SURFACE. STAINLESS STEEL BOLTS WILL BE USED.
19. EQUIPOTENTIAL BUSBARS WILL HAVE 3 HOLES.
20. BEFORE COMMISIONING CONTINUTY AND FALL-OF POTENTIAL TESTS SHALL BE CONDCUTED.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

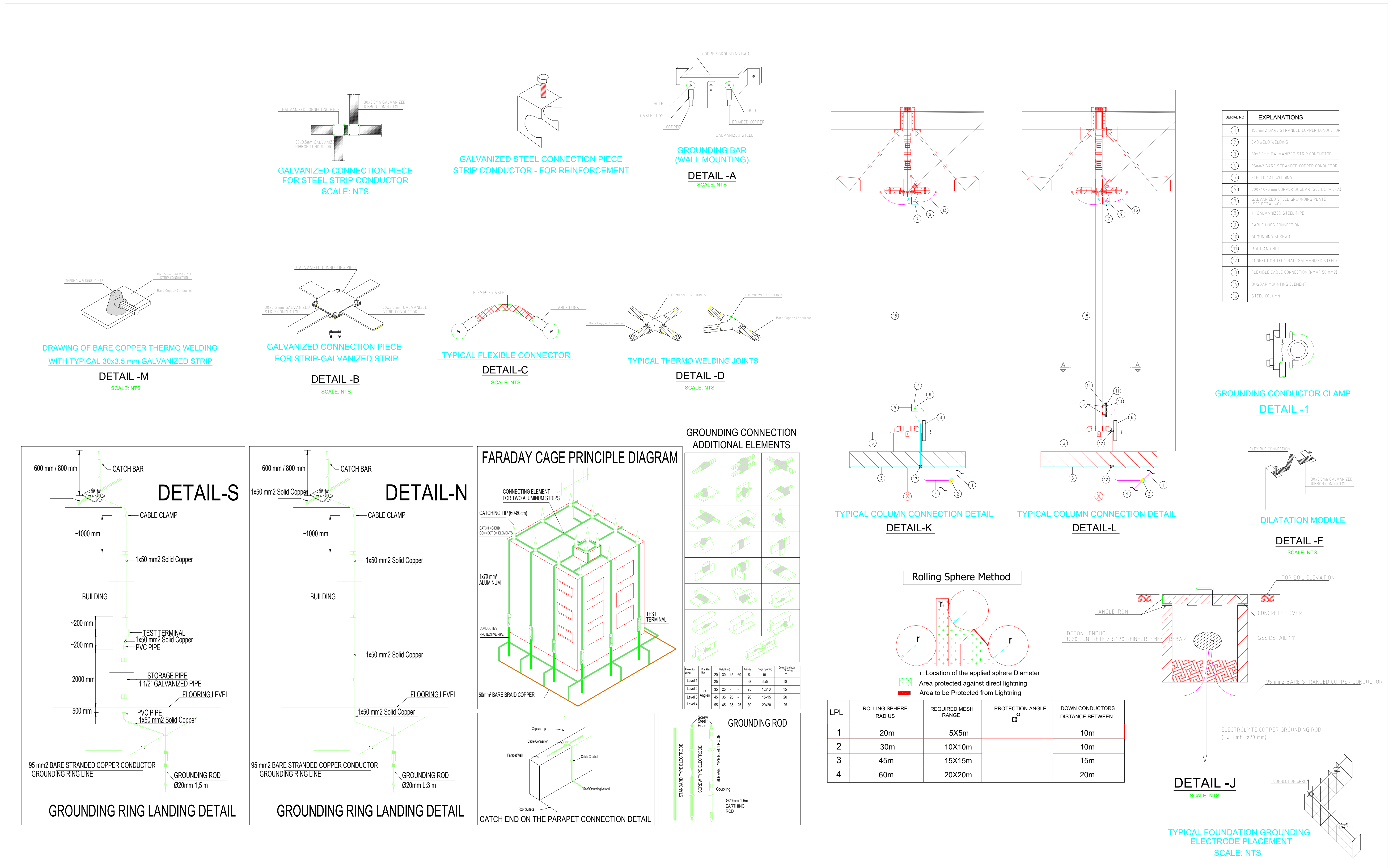
SIZE	SCALE
A0	1/50

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2208

SHEET: 3
OF: 4

DRAWING NAME:
ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING
LIGHTNING PROTECTION SECTION PLAN


GALVANIZED CONNECTING PIECE
30x3.5mm GALVANIZED RIBBON CONDUCTOR
GALVANIZED CONNECTION PIECE FOR STEEL STRIP CONDUCTOR
SCALE: NTS
GALVANIZED STEEL CONNECTION PIECE STRIP CONDUCTOR - FOR REINFORCEMENT
COPPER GROUNDING BAR
HOLE
CABLE LUGS
COPPER
BRAIDED COPPER
GALVANIZED STEEL
GROUNDING BAR (WALL MOUNTING)
DETAIL -A
SCALE: NTS
THERMO WELDING JOINTS
30x3.5 mm GALVANIZED STRIP CONDUCTOR
Bare Copper Conductor
DRAWING OF BARE COPPER THERMO WELDING WITH TYPICAL 30x3.5 mm GALVANIZED STRIP
DETAIL -M
SCALE: NTS
GALVANIZED CONNECTING PIECE
30x3.5 mm GALVANIZED STRIP CONDUCTOR
GALVANIZED CONNECTION PIECE FOR STRIP-GALVANIZED STRIP
DETAIL -B
SCALE: NTS
FLEXIBLE CABLE
CABLE LUGS
TYPICAL FLEXIBLE CONNECTOR
DETAIL-C
SCALE: NTS
THERMO WELDING JOINTS
Bare Copper Conductor
TYPICAL THERMO WELDING JOINTS
DETAIL -D
SCALE: NTS
600 mm / 800 mm
CATCH BAR
DETAIL-S
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
~200 mm
~200 mm
TEST TERMINAL
1x50 mm2 Solid Copper
PVC PIPE
2000 mm
STORAGE PIPE
1 1/2" GALVANIZED PIPE
FLOORING LEVEL
500 mm
PVC PIPE
1x50 mm2 Solid Copper
95 mm2 BARE STRANDED COPPER CONDUCTOR
GROUNDING RING LINE
GROUNDING ROD
Ø20mm 1,5 m
GROUNDING RING LANDING DETAIL
600 mm / 800 mm
CATCH BAR
1x50 mm2 Solid Copper
DETAIL-N
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
1x50 mm2 Solid Copper
FLOORING LEVEL
1x50 mm2 Solid Copper
95 mm2 BARE STRANDED COPPER CONDUCTOR
GROUNDING RING LINE
GROUNDING ROD
Ø20mm L:3 m
GROUNDING RING LANDING DETAIL
FARADAY CAGE PRINCIPLE DIAGRAM
CONNECTING ELEMENT FOR TWO ALUMINUM STRIPS
CATCHING TIP (60-80cm)
CATCHING END CONNECTION ELEMENTS
1x70 mm² ALUMINUM
CONDUCTIVE PROTECTIVE PIPE
TEST TERMINAL
50mm² BARE BRAID COPPER
GROUNDING CONNECTION ADDITIONAL ELEMENTS
Capture Tip
Cable Connector
Parapet Wall
Cable Crochet
Roof Grounding Network
Roof Surface
CATCH END ON THE PARAPET CONNECTION DETAIL
GROUNDING ROD
Screw Steel Head
STANDARD TYPE ELECTRODE
SCREW TYPE ELECTRODE
SLEEVE TYPE ELECTRODE
Coupling
Ø20mm-1.5m EARTHING ROD
1
2
3
4
5
7
8
9
10
11
12
13
14
15
A
A
TYPICAL COLUMN CONNECTION DETAIL
DETAIL-K
TYPICAL COLUMN CONNECTION DETAIL
DETAIL-L
GROUNDING CONDUCTOR CLAMP
DETAIL -1
FLEXIBLE CONNECTION
30x3.5mm GALVANIZED RIBBON CONDUCTOR
DILATATION MODULE
DETAIL -F
SCALE: NTS
Rolling Sphere Method
r
r
r
TOP SOIL ELEVATION
ANGLE IRON
CONCRETE COVER
BETON HENDHOL (C20 CONCRETE / S420 REINFORCEMENT REBAR)
SEE DETAIL "1"
95 mm2 BARE STRANDED COPPER CONDUCTOR
ELECTROLYTE COPPER GROUNDING ROD (L= 3 mt, Ø20 mm)
DETAIL -J
SCALE: NTS
CONNECTION SPROUT
TYPICAL FOUNDATION GROUNDING ELECTRODE PLACEMENT
SCALE: NTS

Protection Level	Franklin Bar	Height (m)				Activity	Cage Spacing	Down Conductor Spacing
		20	30	45	60	%	m	m
Level 1	α Angles	25	-	-	-	98	5x5	10
Level 2		35	25	-	-	95	10x10	15
Level 3		45	35	25	-	90	15x15	20
Level 4		55	45	35	25	80	20x20	25

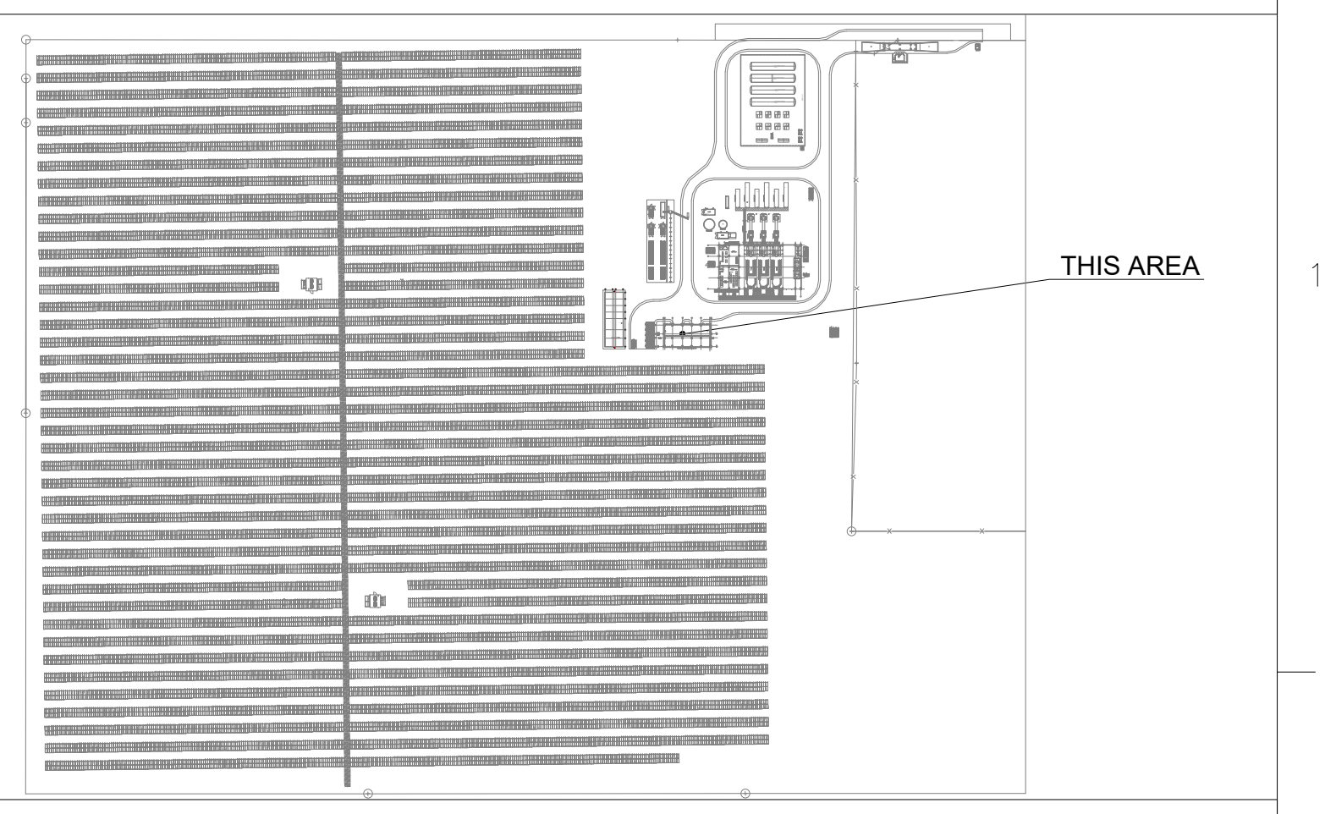
SERIAL NO	EXPLANATIONS
①	150 mm2 BARE STRANDED COPPER CONDUCTOR
②	CADWELD WELDING
③	30x3.5mm GALVANIZED STRIP CONDUCTOR
④	95mm2 BARE STRANDED COPPER CONDUCTOR
⑤	ELECTRICAL WELDING
⑥	300x40x5 mm COPPER BUSBAR (SEE DETAIL-A)
⑦	GALVANIZED STEEL GROUNDING PLATE (SEE DETAIL-G)
⑧	1" GALVANIZED STEEL PIPE
⑨	CABLE LUGS CONNECTION
⑩	GROUNDING BUSBAR
⑪	BOLT AND NUT
⑫	CONNECTION TERMINAL (GALVANIZED STEEL)
⑬	FLEXIBLE CABLE CONNECTION (NYAF 50 mm2)
⑭	BUSBAR MOUNTING ELEMENT
⑮	STEEL COLUMN

r: Location of the applied sphere Diameter
▨ Area protected against direct lightning
🟥 Area to be Protected from Lightning

LPL	ROLLING SPHERE RADIUS	REQUIRED MESH RANGE	PROTECTION ANGLE α°	DOWN CONDUCTORS DISTANCE BETWEEN
1	20m	5X5m		10m
2	30m	10X10m		10m
3	45m	15X15m		15m
4	60m	20X20m		20m

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2208-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION PLAN-1, PLUS -2, PLUS 3, PLUS 4.
SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.

KEY-PLAN



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ABA-ENG-GEN-LYT-0001 PROJECT LAYOUT

LEGEND

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CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY — POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

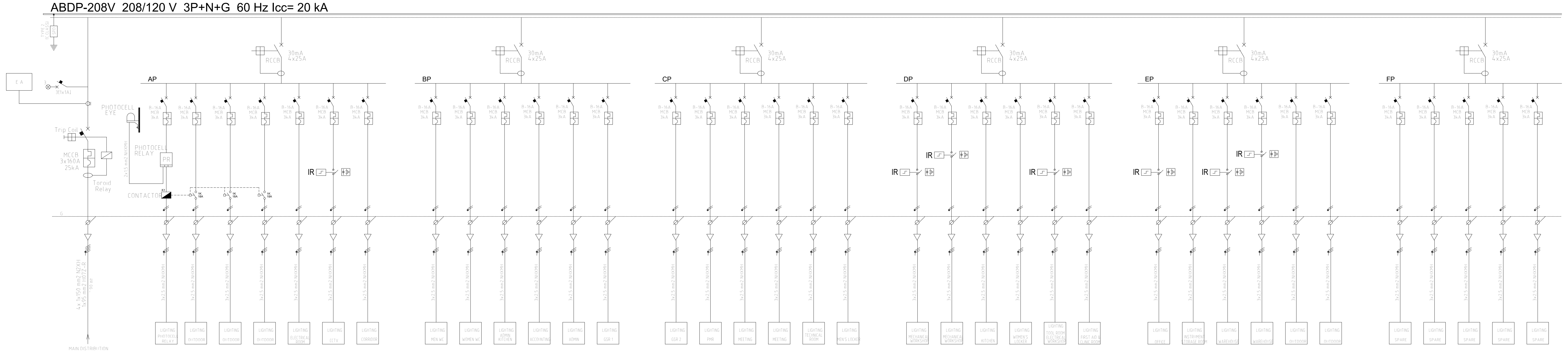
ISSUE OWNER

SIZE	SCALE
A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	28.11.25	FOR REVIEW	M.G.	C.U.	M.S.
0	14.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER: ABA-ENG-ELC-DRW-2208
SHEET: 4
OF: 4
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING LIGHTNING PROTECTION DATAIL PLAN

ABDP-208V SINGLE LINE DIAGRAM


ABDP-208V 208/120 V 3P+N+G 60 Hz Icc= 20 kA
TYPE 2 (C CLASS) SPD
E A
3(1x1A)
Trip Coil
MCCB 3x160A 25kA
Toroid Relay
PHOTOCELL EYE
PHOTOCELL RELAY
PR
2x1,5 mm2 NHXMH
CONTACTOR
K1
1K 18A
RCCB 30mA 4x25A
AP
BP
CP
DP
EP
FP
B-16A MCB 3kA
IR
G
MAIN DISTRIBUTION PANEL
LIGHTING PHOTOCELL RELAY
LIGHTING OUTDOOR
LIGHTING ELECTRICAL ROOM
LIGHTING CCTV
LIGHTING CORRIDOR
LIGHTING MEN WC
LIGHTING WOMEN WC
LIGHTING ADMIN KITCHEN
LIGHTING ACCOUNTING
LIGHTING ADMIN
LIGHTING GSR 1
LIGHTING GSR 2
LIGHTING PMR
LIGHTING MEETING
LIGHTING TECHNICAL ROOM
LIGHTING MEN'S LOCKER
LIGHTING MECHANICAL WORKSHOP
LIGHTING KITCHEN
LIGHTING WOMEN'S LOCKER
LIGHTING TOOL ROOM ELECTRICAL WORKSHOP
LIGHTING FIRST AID & CLINIC ROOM
LIGHTING OFFICE
LIGHTING INSTRUMENT STORAGE ROOM
LIGHTING WAREHOUSE
LIGHTING SPARE

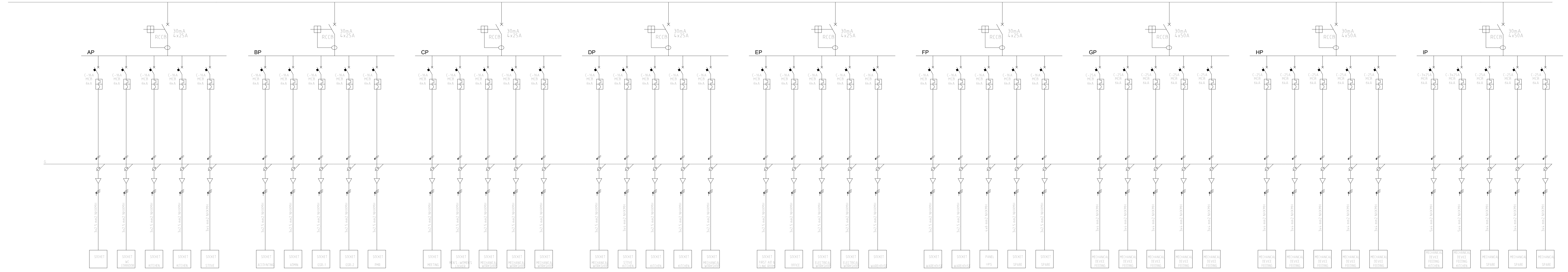
LINE NUMBER		INCOMING		A	1	2	3	4	5	6	
LOAD	EXPLANATION			LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	
	DEVICE NO										
	LOCATION							F14	F13	F09	
	PIECE			1	2	4	3	5	4	6	
	DEVICE POWER (W)			20	18	18	18	34	34	34	
	VOLTAGE (V)	208		120	120	120	120	120	120	120	
	POWER SUPPLY	3P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	
PHASE	R (W)	29692			36			170			
	S (W)	28071				72			136		
	T (W)	28233		20			54			210	
INSTALLED CAPACITY (W)		85996									
DIVERSITY (%)		80									
TOTAL POWER (W)		68797									
DISTANCE (m)											

LINE NUMBER		7	8	9	10	11	12		13	14	15	16	17	18	
LOAD	EXPLANATION	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING		LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	
	DEVICE NO														
	LOCATION	F07	F06	F05	F04	F03	F02		F01	F10	F11	F11	F12	B11	
	PIECE	6	6	3	6	6	6		6	6	6	6	6	8	
	DEVICE POWER (W)	20	20	34	34	34	34		34	34	34	34	34	20	
	VOLTAGE (V)	120	120	120	120	120	120		120	120	120	120	120	120	
	POWER SUPPLY	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	
PHASE	R (W)	120			204				204			204			
	S (W)		120			204				204			204		
	T (W)			102			204				204			160	
INSTALLED CAPACITY (W)															
DIVERSITY (%)															
TOTAL POWER (W)															
DISTANCE (m)															

LINE NUMBER		19	20	21	22	23	24		25	26	27	28	29	30		31	32	33	34	35
LOAD	EXPLANATION	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING		LIGHTING	LIGHTING	LIGHTING	LIGHTING	OUTDOOR LIGHTING	OUTDOOR LIGHTING						
	DEVICE NO																			
	LOCATION	B03	B03	B04	B10	B08 B09	B02		B06	B07	B01	B01	Z02	Z02						
	PIECE	4	9	5	5	7	5		6	2	8	5	1	1						
	DEVICE POWER (W)	28	28	34	20	28	34		34	28	28	28	200	200						
	VOLTAGE (V)	120	120	120	120	120	120		120	120	120	120	120	120						
	POWER SUPPLY	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G						
PHASE	R (W)	112				196				56			200							
	S (W)			170			170				224			200						
	T (W)		252		100				204			140								
INSTALLED CAPACITY (W)																				
DIVERSITY (%)																				
TOTAL POWER (W)																				
DISTANCE (m)																				

THIS DRAWING THE SAME AS DRAWING (PDF-ARCH-E: ABA-ENG-ELC-DRW-2209-REV.1-ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM-1, PLUS -2. SHOULD CONSOLIDATE DRAWINGS NOT TO CREATE CONFUSION. THIS IS THE SAME FOR DRAWING SERIES 2201 THROUGH 2209.

ABDP-208V SINGLE LINE DIAGRAM


ABDP-208V 208/120 V 3P+N+G 60 Hz Icc= 20 kA
AP
BP
CP
DP
EP
FP
GP
HP
IP
RCCB 30mA 4x25A
3x2,5 mm2 NHXMH
3x4 mm2 NHXMH
4x6 mm2 NHXMH
5x4 mm2 NHXMH
SOCKET
SOCKET WC CORRIDOR
SOCKET KITCHEN
SOCKET STOVE
SOCKET ACCOUNTING
SOCKET ADMIN
SOCKET GSR-1
SOCKET GSR-2
SOCKET PMR
SOCKET MEETING
SOCKET MEN'S -WOMEN'S LOCKER
SOCKET MECHANICAL WORKSHOP
SOCKET STOVE KITCHEN
SOCKET FIRST AID & CLINIC ROOM
SOCKET OFFICE
SOCKET ELECTRICAL WORKSHOP
SOCKET WAREHOUSE
PANEL UPS
SOCKET SPARE
MECHANICAL DEVICE FEEDING
MECHANICAL DEVICE FEEDING KITCHEN
MECHANICAL SPARE

LINE NUMBER		1	2	3	4	5		6	7	8	9	10		11	12	13	14	15	
LOAD	EXPLANATION	SOCKET	SOCKET	SOCKET	SOCKET	SOCKET		SOCKET	SOCKET	SOCKET	SOCKET	SOCKET		SOCKET	SOCKET	SOCKET	SOCKET	SOCKET	
	DEVICE NO																		
	LOCATION	F13 F14	F06 F08 F07 F09	F05	F05	F05		F04	F03	F02	F01	F10		F11	B10 B11	B03	B03	B03	
	PIECE	5	5	4	1	1		3	3	3	3	3		3	2	2	2	2	
	DEVICE POWER (W)	300	300	300	2000	2000		300	300	300	300	300		300	300	300	300	300	
	VOLTAGE (V)	120	120	120	120	120		120	120	120	120	120		120	120	120	120	120	
	POWER SUPPLY	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	
PHASE	R (W)				2000							900				600			
	S (W)		1500							900							600		
	T (W)	1500		1200		2000		900	900		900			1200	600			600	
INSTALLED CAPACITY (W)																			
DIVERSITY (%)																			
TOTAL POWER (W)																			
DISTANCE (m)																			

LINE NUMBER		16	17	18	19	20		21	22	23	24	25		26	27	28	29	30	
LOAD	EXPLANATION	SOCKET	SOCKET	SOCKET	SOCKET	SOCKET		SOCKET	SOCKET	SOCKET	SOCKET	SOCKET		SOCKET	SOCKET	PANEL FEED LINE			
	DEVICE NO																		
	LOCATION	B03	B04	Z02	Z02	B03		B02	B06	B09	B09	B01		B01	B01				
	PIECE	2	1	5	1	2		5	4	2	4	5		2	2	1			
	DEVICE POWER (W)	300	2000	300	2000	300		300	300	300	300	300		300	300				
	VOLTAGE (V)	120	120	120	120	120		120	120	120	120	120		120	120	208			
	POWER SUPPLY	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	3P+N+G			
PHASE	R (W)	600			2000				1200			1500				2090			
	S (W)		2000			600				600				600		2167			
	T (W)			1500				1500			1200				600	1683			
INSTALLED CAPACITY (W)																			
DIVERSITY (%)																			
TOTAL POWER (W)																			
DISTANCE (m)																			

LINE NUMBER		31	32	33	34	35		36	37	38	39	40		41	42	43	44	45
LOAD	EXPLANATION	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER		SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER	SPLIT AIR CONDITIONER						
	DEVICE NO																	
	LOCATION													Z02	F05			
	PIECE	1	1	1	1	1		1	1	1	1	1		1	1			
	DEVICE POWER (W)	3500	3500	3500	3500	3500		3500	3500	3500	3500	3500		5000	5000			
	VOLTAGE (V)	120	120	120	120	120		120	120	120	120	120		208	208			
	POWER SUPPLY	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		3P+N+G	3P+N+G			
PHASE	R (W)	3500			3500			3500			3500			1600	1700			
	S (W)		3500			3500			3500			3500		1700	1700			
	T (W)			3500						3500				1700	1600			
INSTALLED CAPACITY (W)																		
DIVERSITY (%)																		
TOTAL POWER (W)																		
DISTANCE (m)																		

KEY-PLAN

SYMBOL LIST

SYMBOL	EXPLANATIONS
MCB	MICRO CIRCUIT BREAKER
MCCB	THERMAL MAGNETIC SWITCH
	CONTACTOR
	TOROID ROLE
ACB (ETU)	OPEN TYPE CIRCUIT BREAKER (ELECTRONIC TRIP UNIT)
RCCB	LEAKAGE CURRENT PROTECTION SWITCH
	REMOTE CONTROL KEY
	TRIP COIL
Id	LEAKAGE CURRENT RELAY
EA	ENERGY ANALYZER
IR	IMPULSE CURRENT SWITCH
⊗	SIGNAL LAMP
	AKIM TRAFOSU
TYPE 2 (C CLASS) SPD	PARAFUDR
◁	CABLE GLAND
	1 PHASE NEUTRAL AND GROUND
	3 PHASE AND NEUTRAL
	3 PHASE NEUTRAL AND GROUND

NOTE:

- FINAL SHORT CIRCUIT CALCULATIONS IN ALL PANELS; THEY WILL BE RE-CALCULATED BY THE MANUFACTURER DURING PRODUCTION AND APPROVED BY THE EMPLOYER.

- ALL MATERIALS AND STRUCTURAL FORMS USED IN PANEL MANUFACTURING MUST BE TESTED FOR THERMAL AND MAGNETIC SHORT CIRCUIT ENDURANCE CAPACITY ACCORDING TO THE RELEVANT STANDARDS, CERTIFIED, AND ARE UNDER THE RESPONSIBILITY OF THE MANUFACTURER.

- SINGLE-PHASE AND THREE-PHASE LIGHTING FUSES SHALL BE 6 kA, ALL CIRCUIT BREAKERS SHALL BE TYPE C.
RESIDUAL CURRENT PROTECTION RELAYS SHALL BE AT LEAST 20 kA.

- CABLE COLOR CODES SHALL BE BLACK-BROWN-GRAY IN THE ORDER OF R-S-T.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
1.5A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	30.12.25	FOR APPROVAL	M.G.	C.U.	M.S.
0	10.10.25	FOR REVIEW	M.G.	C.U.	M.S.

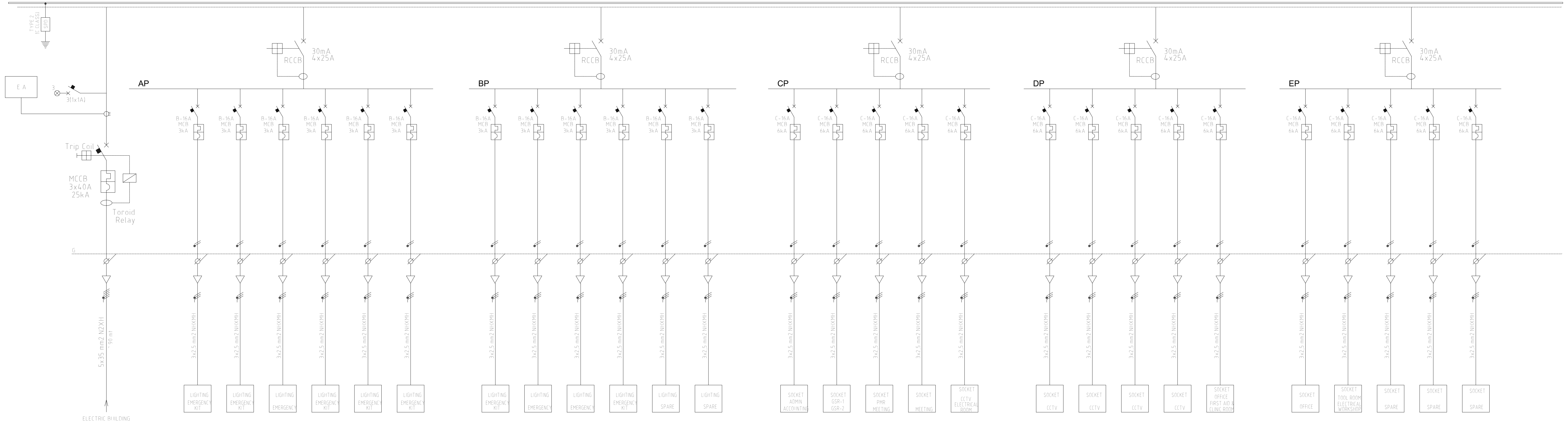
DRAWING NUMBER:
ABA-ENG-ELC-DRW-2209

SHEET: 1
OF: 2

DRAWING NAME:
ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING
SINGLE LINE DIAGRAM

ABDP-208V UPS SINGLE LINE DIAGRAM

ABDP-208V UPS 208/120 V 3P+N+G 60 Hz Icc= 20 kA

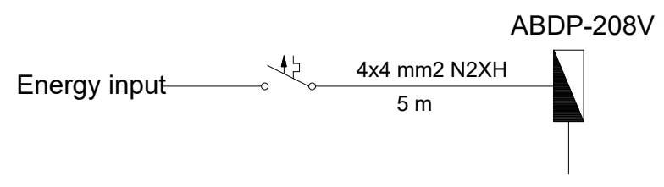

TYPE 2 (C CLASS) SPD
E A
3
3(1x1A)
Trip Coil
MCCB 3x40A 25kA
Toroid Relay
G
5x35 mm2 N2XH ~ 90 mt
ELECTRIC BUILDING
RCCB 30mA 4x25A
AP
BP
CP
DP
EP
B-16A MCB 3kA
C-16A MCB 6kA
3x2,5 mm2 NHXMH
LIGHTING EMERGENCY KIT
LIGHTING EMERGENCY
LIGHTING SPARE
SOCKET ADMIN ACCOUNTING
SOCKET GSR-1 GSR-2
SOCKET PMR MEETING
SOCKET MEETING
SOCKET CCTV ELECTRICAL ROOM
SOCKET CCTV
SOCKET OFFICE FIRST AID & CLINIC ROOM
SOCKET OFFICE
SOCKET TOOL ROOM ELECTRICAL WORKSHOP
SOCKET SPARE

LINE NUMBER		INCOMING		1	2	3	4	5	6		7	8	9	10	11	12		1	2	3	4	5		6	7	8	9	10		11	12	13	14	15
LOAD	EXPLANATION			LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING	LIGHTING		LIGHTING	LIGHTING	LIGHTING	LIGHTING																				
	DEVICE NO																																	
	LOCATION																	F03 F04	F01 F02	F10 F11	F11	F12 F13		F13	F13	F13	F13	B02 B06		B06	B08 B09			
	PIECE			5	4	2	8	8	4		8	3	3	7				4	4	4	4	4		1	1	1	1	4		4	4			
	DEVICE POWER (W)			10	10	5	10	10	10		10	5	5	10				300	300	300	300	300		300	300	600	600	300		300	300			
	VOLTAGE (V)	208		120	120	120	120	120	120																									
	POWER SUPPLY	3P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G				1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G	1P+N+G	1P+N+G	1P+N+G		1P+N+G	1P+N+G			
PHASE	R (W)	4180		50			80				80			70				1200			1200				300			1200						
	S (W)	4335			40			80				15							1200			1200				600				1200				
	T (W)	3365				10			40				15							1200				300			600				1200			
INSTALLED CAPACITY (W)		11880																																
DIVERSITY (%)		50																																
TOTAL POWER (W)		5940																																
DISTANCE (m)																																		

UPS ACCOUNT

Installed Capacity	=	11880 W
Demand Power	=	5940 W
Cos Ø	=	0.80
UPS Power	=	7425 VA
Selected UPS	=	7.5 kVA (3 Hours)

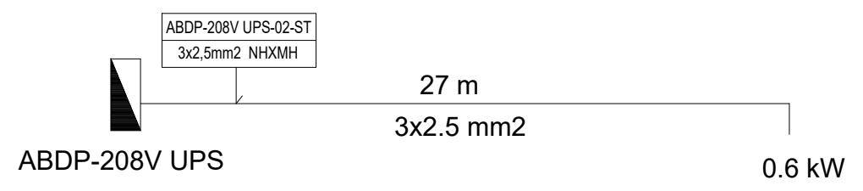
VOLTAGE DROP CALCULATIONS


ABDP-208V UPS
Energy input
4x4 mm2 N2XH
5 m

IC= 11.880 kW
TP= 5.940 kW

$$\%ek = 0.041\left(\frac{5.940 \times 5}{4}\right) = 0.30$$

ABDP-208V UPS PANEL FOR LINE 02


ABDP-208V UPS-02-ST
3x2,5mm2 NHXMH
27 m
3x2.5 mm2
ABDP-208V UPS
0.6 kW

$$\%el = 0.248\left(\frac{0.6 \times 27}{2.5}\right) = 1.6$$

%e= ek + el = 0.3+1.6 = 1.9 < 2 SUITABLE

SECTION CONTROL CALCULATION

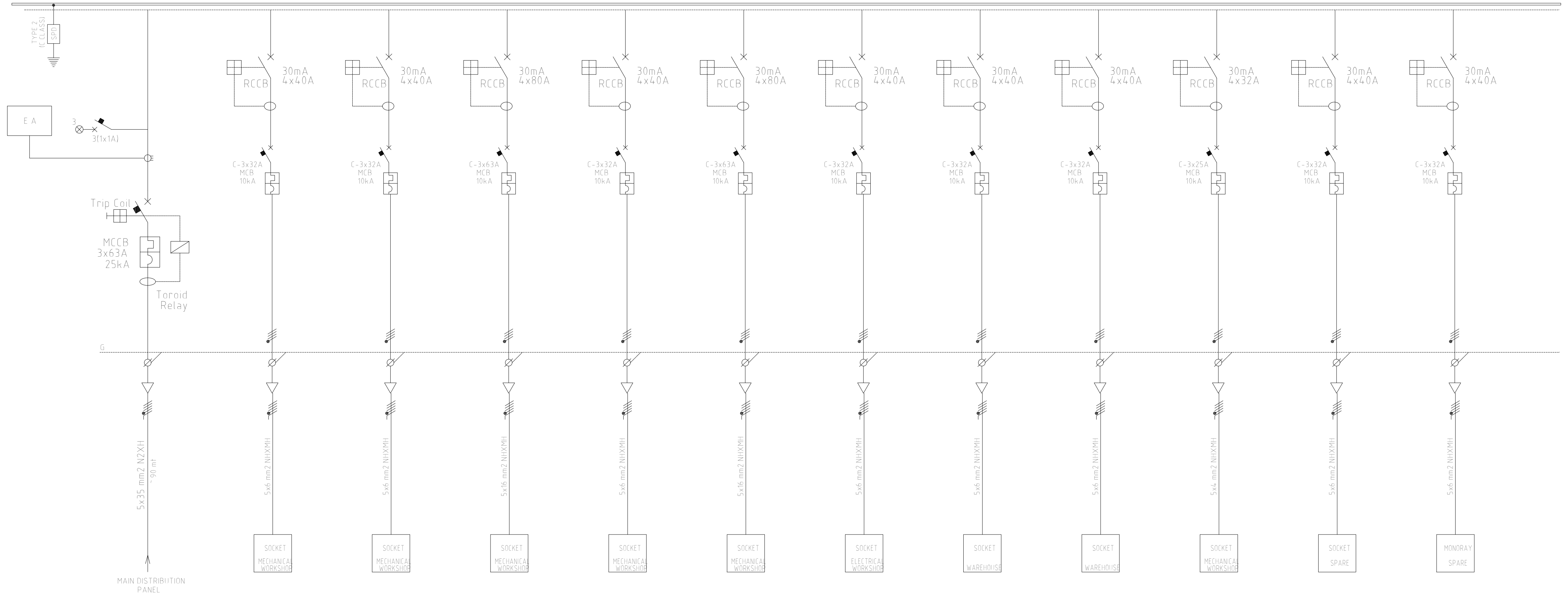
$$I = \frac{P}{U \times \mathrm{Cos}\,Q \times \sqrt{3}} = \frac{5940}{208 \times 0.8 \times 1.73} = \frac{5940}{288} = 20.62\ A$$

I = 20.62 A < 34 A SUITABLE

4x4mm² N2XH CABLE CARRIES 34 A CURRENT IN AIR

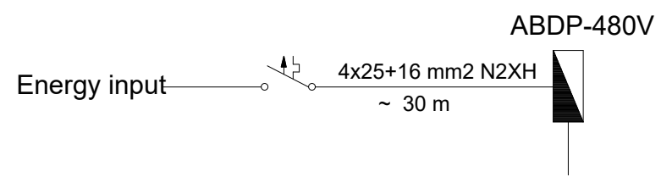
ABDP-480V SINGLE LINE DIAGRAM

ABDP-480V 480 V 3P+N+G 60 Hz Icc= 31.5 kA


TYPE 2 (C CLASS) SPD
E A
3
3(1x1A)
Trip Coil
MCCB 3x63A 25kA
Toroid Relay
G
5x35 mm2 N2XH ~ 90 mt
MAIN DISTRIBUTION PANEL
RCCB 30mA 4x40A
RCCB 30mA 4x80A
C-3x32A MCB 10kA
C-3x63A MCB 10kA
5x6 mm2 NHXMH
5x16 mm2 NHXMH
SOCKET MECHANICAL WORKSHOP
SOCKET ELECTRICAL WORKSHOP
SOCKET WAREHOUSE
SOCKET SPARE
MONORAY SPARE

LINE NUMBER		INCOMING		1		2		3		4		5		6		7		8		9		10		11
LOAD	EXPLANATION			SOCKET		SOCKET		SOCKET		SOCKET		SOCKET		SOCKET		SOCKET		SOCKET		MONORAY				
	DEVICE NO																							
	LOCATION			B03		B03		B03		B03		B03		B09		B01		B01		B03				
	PIECE			1		1		1		1		1		1		1		1		1				
	DEVICE POWER (W)			1500		1500		1500		1500		1500		1500		1500		1500		1500				
	VOLTAGE (V)	480		480		480		480		480		480		480		480		480		480				
	POWER SUPPLY	3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G		3P+N+G				
PHASE	R (W)	23000		2000		2000		5000		2000		5000		2000		2000		2000		1000				
	S (W)	23000		2000		2000		5000		2000		5000		2000		2000		2000		1000				
	T (W)	23000		2000		2000		5000		2000		5000		2000		2000		2000		1000				
INSTALLED CAPACITY (W)		69000																						
DIVERSITY (%)		60																						
TOTAL POWER (W)		41400																						
DISTANCE (m)																								

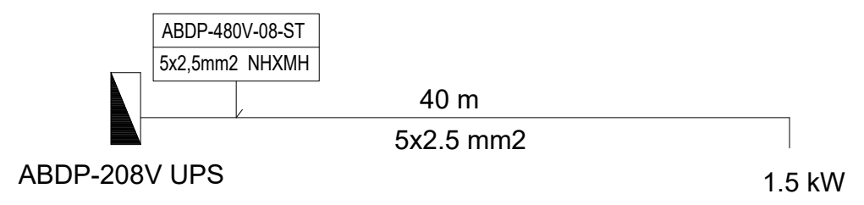
VOLTAGE DROP CALCULATIONS


ABDP-480V
Energy input
4x25+16 mm2 N2XH
~ 30 m

IC= 69.000 kW
TP= 41.400 kW

$$\%ek = 0.00775\left(\frac{41.4 \times 30}{25}\right) = 0.385$$

ABDP-480V PANEL FOR LINE 08


ABDP-480V-08-ST
5x2,5mm2 NHXMH
40 m
5x2.5 mm2
ABDP-208V UPS
1.5 kW

$$\%el = 0.00775\left(\frac{1.5 \times 40}{2.5}\right) = 0.186$$

%e= ek + el = 0.385+0.186 = 0.571 < 2 SUITABLE

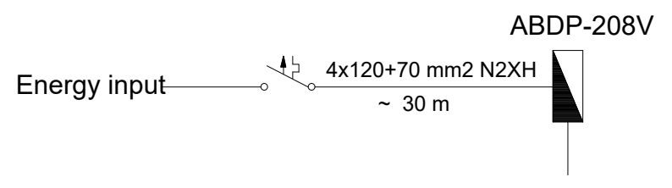
SECTION CONTROL CALCULATION

$$I = \frac{P}{U \times \mathrm{Cos}\,Q \times \sqrt{3}} = \frac{69000}{480 \times 0.8 \times 1.73} = \frac{69000}{665} = 103.7\ A$$

I = 103.7 A < 133 A SUITABLE

4x25+16m² N2XH CABLE CARRIES 133 A CURRENT IN AIR

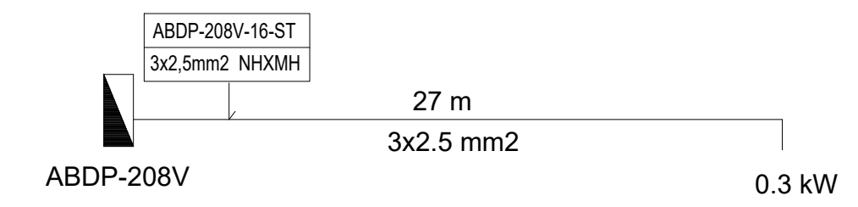
VOLTAGE DROP CALCULATIONS


ABDP-208V
Energy input
4x120+70 mm2 N2XH
~ 30 m

IC= 85.996 kW
TP= 68797 kW

$$\%ek = 0.041\left(\frac{68.797 \times 30}{120}\right) = 0.7$$

ABDP-208V PANEL FOR LINE 17


ABDP-208V-16-ST
3x2,5mm2 NHXMH
27 m
3x2.5 mm2
ABDP-208V
0.3 kW

$$\%el = 0.248\left(\frac{0.3 \times 27}{2.5}\right) = 0.80$$

%e= ek + el = 0.7+0,80 = 1.5 < 2 SUITABLE

SECTION CONTROL CALCULATION

$$I = \frac{P}{U \times \mathrm{Cos}\,Q \times \sqrt{3}} = \frac{85996}{208 \times 0.8 \times 1.73} = \frac{85996}{288} = 298.59\ A$$

I = 298.59 A < 359 A SUITABLE

4x120+70m² N2XH CABLE CARRIES 359 A CURRENT IN AIR

3 PHASE

$$\%e = \frac{100 \times L \times S}{K \times A \times V^2}$$

L: cable length
S: power
K: unit resistance (56 for copper)
A: conductor area
V: 3 phase voltage

1 PHASE

$$\%e = \frac{200 \times L \times S}{K \times A \times V^2}$$

L: cable length
S: power
K: unit resistance (56 for copper)
A: conductor area
V: 3 phase voltage

KEY-PLAN

SYMBOL LIST

SYMBOL	EXPLANATIONS
MCB	MICRO CIRCUIT BREAKER
MCCB	THERMAL MAGNETIC SWITCH
	CONTACTOR
	TOROID ROLE
ACB (ETU)	OPEN TYPE CIRCUIT BREAKER (ELECTRONIC TRIP UNIT)
RCCB	LEAKAGE CURRENT PROTECTION SWITCH
	REMOTE CONTROL KEY
	TRIP COIL
Id	LEAKAGE CURRENT RELAY
EA	ENERGY ANALYZER
IR	IMPULSE CURRENT SWITCH
⊗	SIGNAL LAMP
	AKIM TRAFOSU
TYPE 2 (C CLASS) SPD	PARAFUDR
	CABLE GLAND
	1 PHASE NEUTRAL AND GROUND
	3 PHASE AND NEUTRAL
	3 PHASE NEUTRAL AND GROUND

NOTE:

- FINAL SHORT CIRCUIT CALCULATIONS IN ALL PANELS; THEY WILL BE RE-CALCULATED BY THE MANUFACTURER DURING PRODUCTION AND APPROVED BY THE EMPLOYER.
- ALL MATERIALS AND STRUCTURAL FORMS USED IN PANEL MANUFACTURING MUST BE TESTED FOR THERMAL AND MAGNETIC SHORT CIRCUIT ENDURANCE CAPACITY ACCORDING TO THE RELEVANT STANDARDS, CERTIFIED, AND ARE UNDER THE RESPONSIBILITY OF THE MANUFACTURER.
- SINGLE-PHASE AND THREE-PHASE LIGHTING FUSES SHALL BE 6 kA, ALL CIRCUIT BREAKERS SHALL BE TYPE C. RESIDUAL CURRENT PROTECTION RELAYS SHALL BE AT LEAST 20 kA.
- CABLE COLOR CODES SHALL BE BLACK-BROWN-GRAY IN THE ORDER OF R-S-T.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

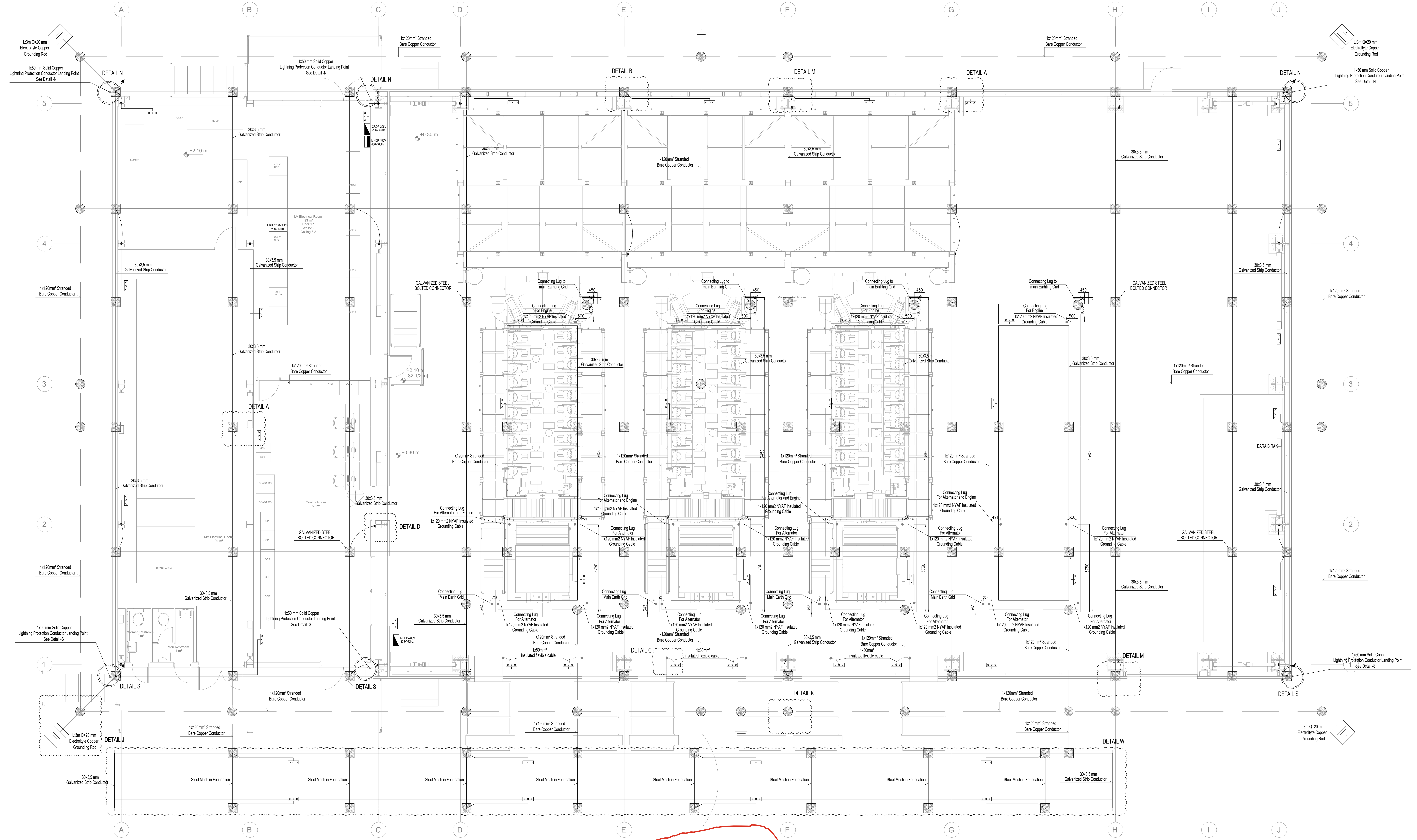
SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
A0	1/1

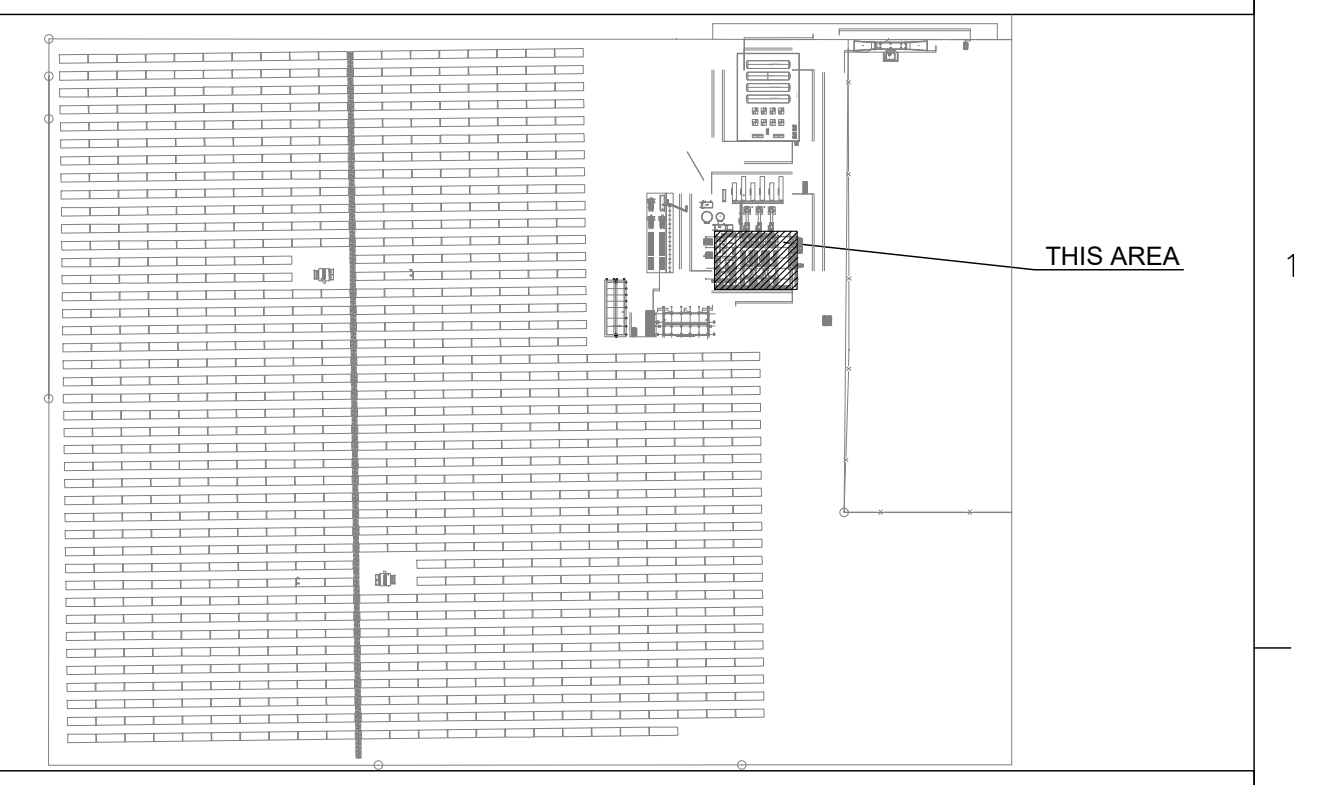
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	30.12.25	FOR APPROVAL	M.G.	C.U.	M.S.
0	10.10.25	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER: ABA-ENG-ELC-DRW-2209
SHEET: 2
OF: 2
DRAWING NAME: ADMINISTRATION WORKSHOP AND WAREHOUSE BUILDING SINGLE LINE DIAGRAM


A
B
C
D
E
F
G
H
I
J
5
4
3
2
1
L:3m Q=20 mm Electroltyte Copper Grounding Rod
1x50 mm Solid Copper Lightning Protection Conductor Landing Point See Detail -N
DETAIL N
1x120mm² Stranded Bare Copper Conductor
30x3,5 mm Galvanized Strip Conductor
ODLP
MCDP
LVMDP
CAP
400 V UPS
208 V UPS
125 V DCDP
EAP-1
EAP-2
EAP-3
EAP-4
CRDP-208V 208V 60Hz
MHDP-480V 480V 60Hz
CRDP-208V UPS 208V 60Hz
+2.10 m
+0.30 m
+2.10 m [82 1/2 in]
LV Electrical Room 93 m² Floor:1.1 Wall:2.2 Ceiling:3.2
GALVANIZED STEEL BOLTED CONNECTOR
DETAIL A
DETAIL B
DETAIL M
DETAIL C
DETAIL D
DETAIL K
DETAIL W
MV Electrical Room 94 m²
SPARE AREA
GAS
FIRE
SCADA RC
GCP
CCP
Control Room 59 m²
Women Restroom 2 m²
Men Restroom 4 m²
MHDP-208V 208V 60Hz
1x50 mm Solid Copper Lightning Protection Conductor Landing Point See Detail -S
DETAIL S
DETAIL J
Connecting Lug to main Earthing Grid
Connecting Lug For Engine
1x120 mm2 NYAF Insulated Grounding Cable
Connecting Lug For Alternator and Engine
Connecting Lug For Alternator
Connecting Lug Main Earth Grid
1x50mm² insulated flexible cable
BARA BIRAK
Steel Mesh in Foundation
450
500
491
250
343
13450
3750
To Admin Building Grounding system 1x120mm² Stranded Bare Copper Conductor

PROVIDE AT LEAST 2 GROUND CONNECTIONS TO THE ADMIN BUILDING GROUND GRID AND WAREHOUSE BUILDING

KEY-PLAN



REFERENCE DRAWINGS

LEGEND

SYMBOL LIST

⚬⚬⚬	Equipotential Busbars tinned - cooppers will have 3 holes.
▬	30x3,5 mm Galvanized Strip Conductor
—	1x120mm² Stranded Bare Copper Conductor
●	Cadvelt source
▨	Galvanized Steel Bolted Connector
⏚	L:3m Q=20 mm Electroltyte Copper Grounding Rod
☐	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
10. ALL STEEL COLUMNS WILL BE GROUNDED USING BRANCHES TAKEN FROM THE GROUNDING CONDUCTOR AT THEIR FOUNDATIONS. ALL STEEL COMPONENTS, EXCEPT FOR THE MAIN STEEL COLUMNS OF THE BUILDING, PLATFORM CARRYING COLUMNS, STEEL PLATFORMS, EQUIPMENT CARRYING PLATFORMS (ETC.), WILL BE CONNECTED TO THE GROUNDING SYSTEM.
11. ALL CABLE TURNS WILL BE GREATER THAN 90°.
12. CONTINUOUS STEEL COMPONENTS WILL BE GROUNDED AT MAXIMUM 20-M INTERVALS.
13. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
14. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
15. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
16. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
17. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
18. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
19. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.(Düzenlendi)
20. Grounding bars used on the surface. Stainless steel bolts will be used.
21. Equipotential Busbars will have 3 holes.
22. Before commisioning continuty and fall-of potential tests shall be condcuted.

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY + POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

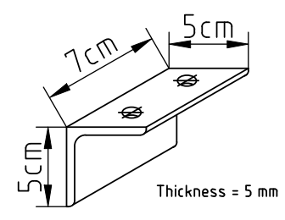
SIZE	SCALE
1.5A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
0	26.12.25	FOR APPROVAL	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2306

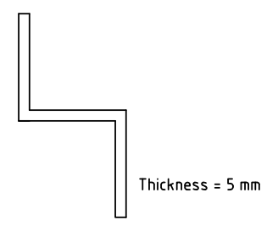
SHEET: 1
OF: 2

DRAWING NAME:
MACHINE HALL AND ELECTRICAL & CONTROL BUILDING
FOUNDATION GROUNDING PLANS


7cm
5cm
5cm
Thickness = 5 mm

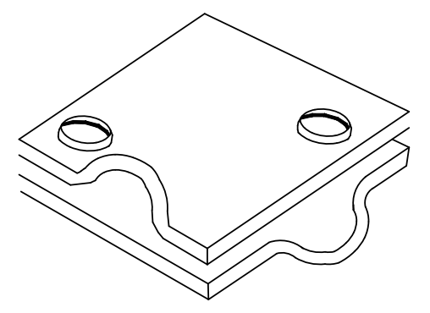
GALVANIZED STEEL GROUNDING PLATE

DETAIL -G
SCALE: NTS


Thickness = 5 mm

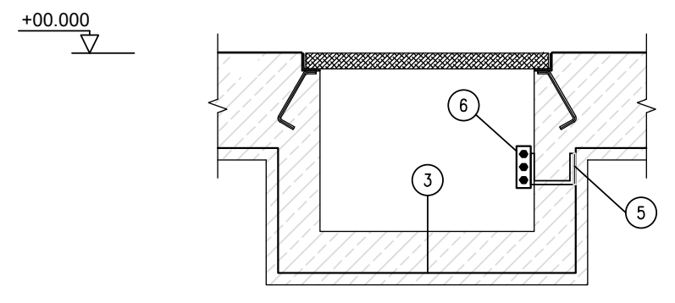
BUSBAR MOUNTING ELEMENT

DETAIL -H
SCALE: NTS



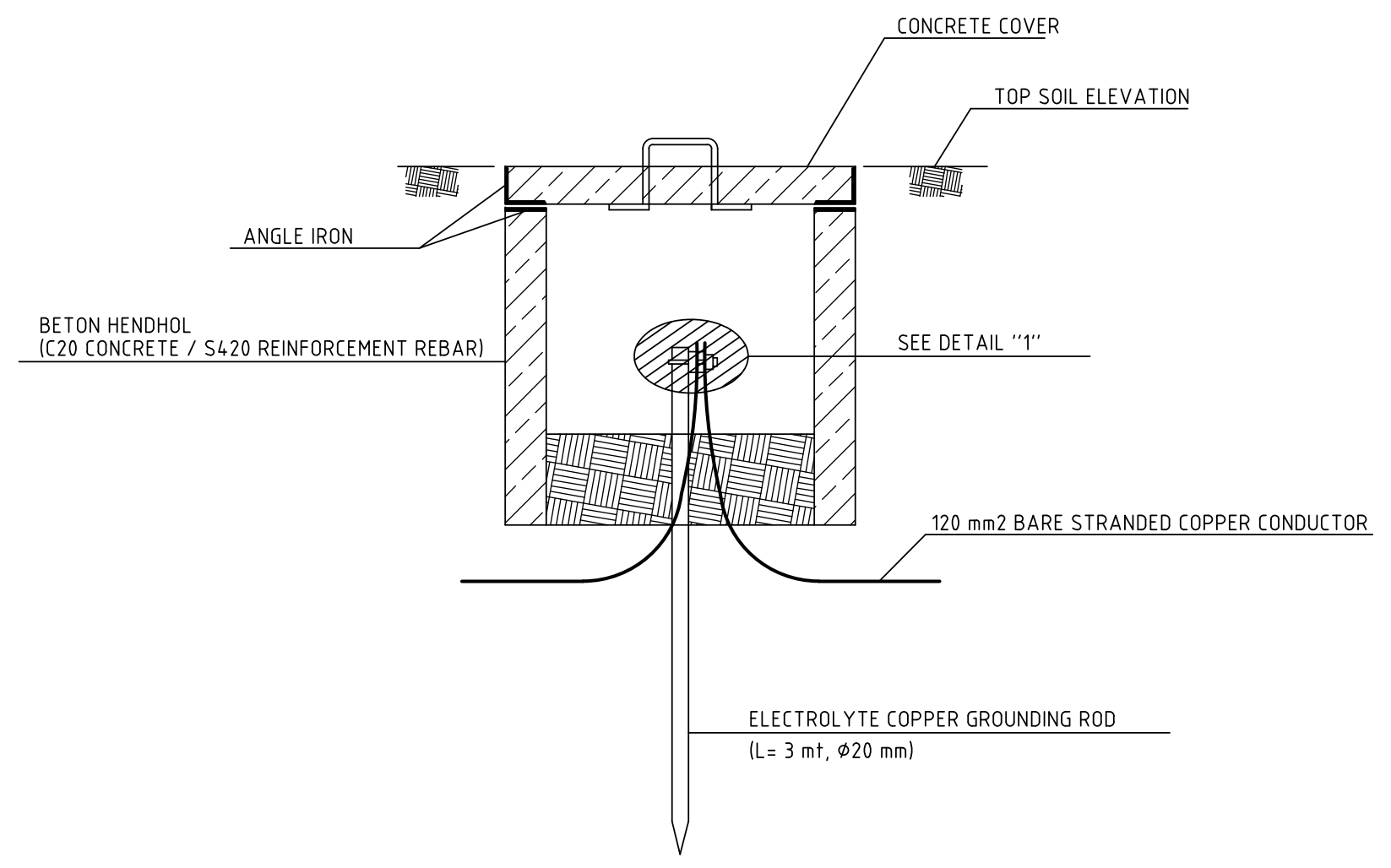
MOUNTING BASE FOR CROSS IRON CONNECTION

DETAIL -K
SCALE: NTS

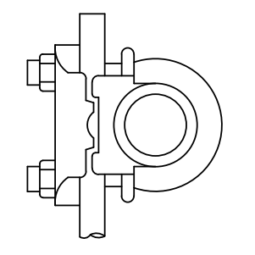


DATAIL -I
SCALE: NTS

NOT:
POINTS WHERE GROUNDING TERMINALS ARE LEFT DURING FIELD MANUFACTURING SOCKET GROUPS WILL BE SUPPLIED IN ACCORDANCE WITH THEIR PLACEMENT.

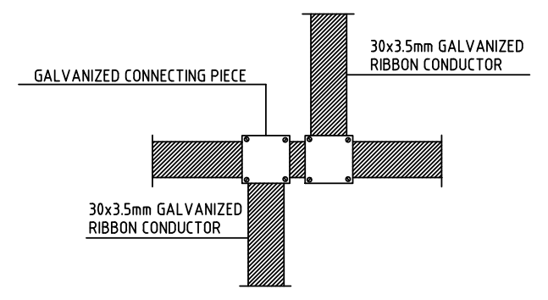

CONCRETE COVER
TOP SOIL ELEVATION
ANGLE IRON
BETON HENDHOL
(C20 CONCRETE / S420 REINFORCEMENT REBAR)
SEE DETAIL "1"
120 mm2 BARE STRANDED COPPER CONDUCTOR
ELECTROLYTE COPPER GROUNDING ROD
(L= 3 mt, Ø20 mm)

DETAIL -J
SCALE: NTS

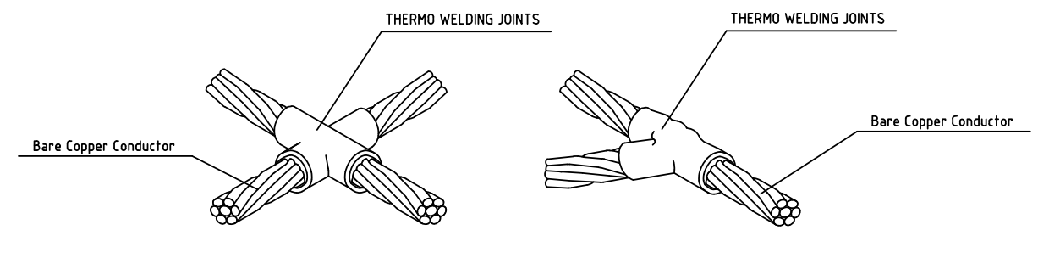


GROUNDING CONDUCTOR CLAMP

DETAIL -1

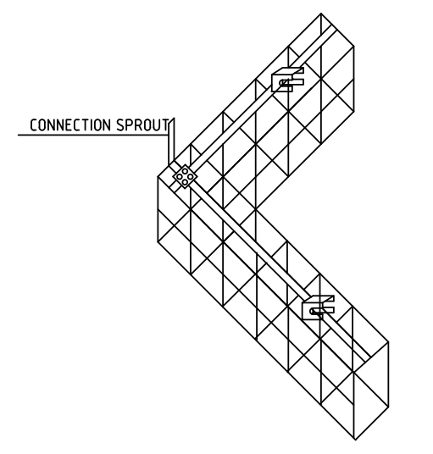

GALVANIZED CONNECTING PIECE
30x3.5mm GALVANIZED RIBBON CONDUCTOR
30x3.5mm GALVANIZED RIBBON CONDUCTOR

GALVANIZED CONNECTION PIECE
FOR STEEL STRIP CONDUCTOR
SCALE: NTS

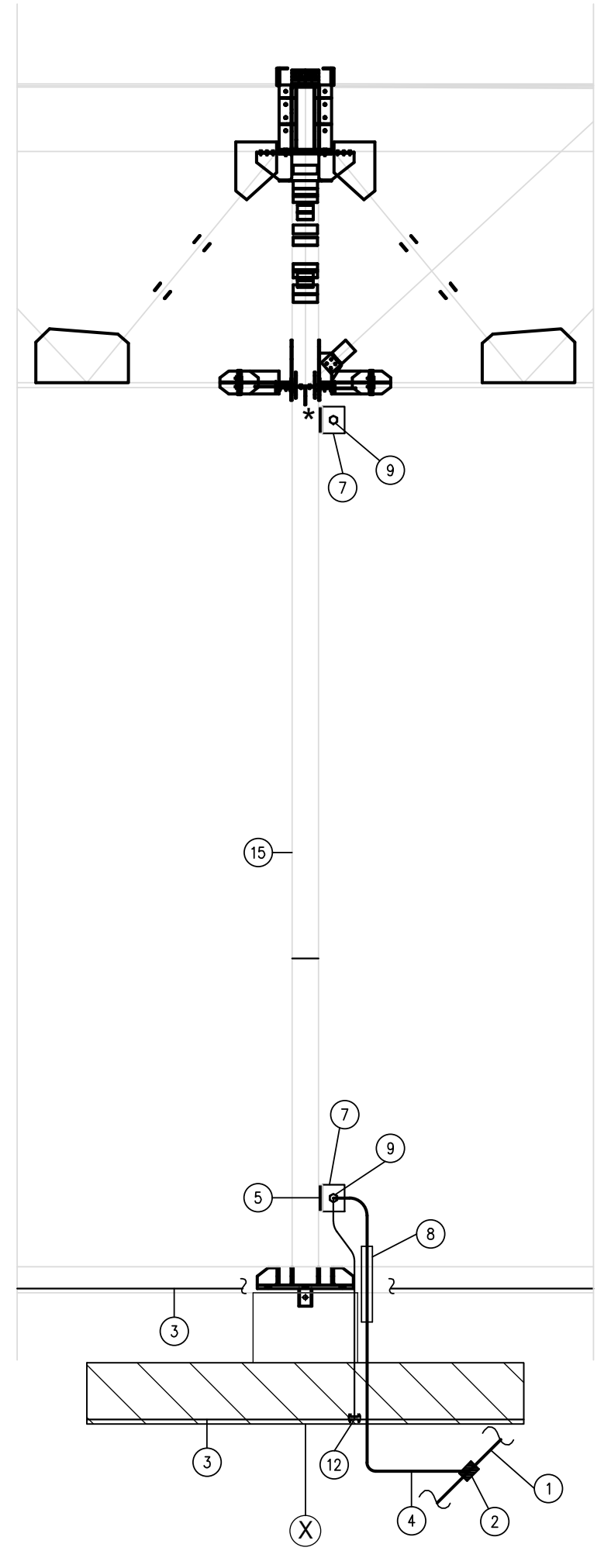

THERMO WELDING JOINTS
THERMO WELDING JOINTS
Bare Copper Conductor
Bare Copper Conductor

TYPICAL THERMO WELDING JOINTS

DETAIL -D
SCALE: NTS

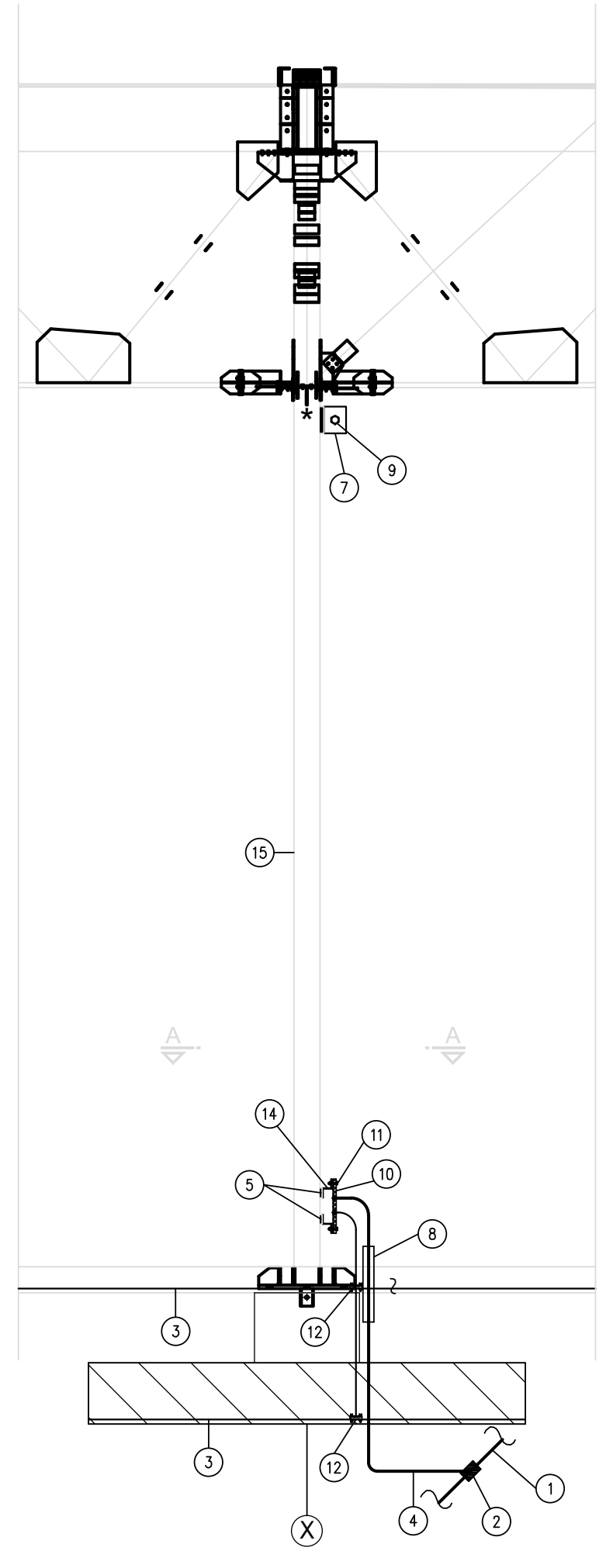

CONNECTION SPROUT

TYPICAL FOUNDATION GROUNDING
ELECTRODE PLACEMENT
SCALE: NTS


7
9
15
7
9
5
8
3
3
12
X
4
2
1

TYPICAL COLUMN CONNECTION DETAIL

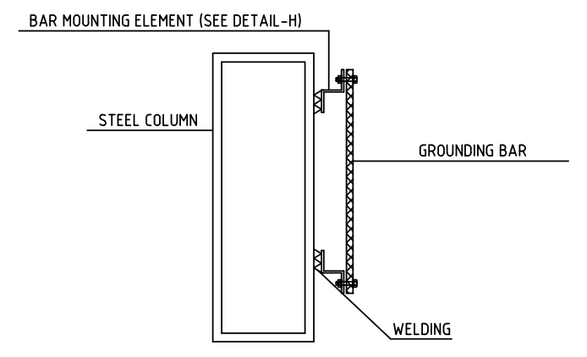
DETAIL-K


7
9
15
A
A
14
11
10
5
8
3
12
12
X
4
2
1

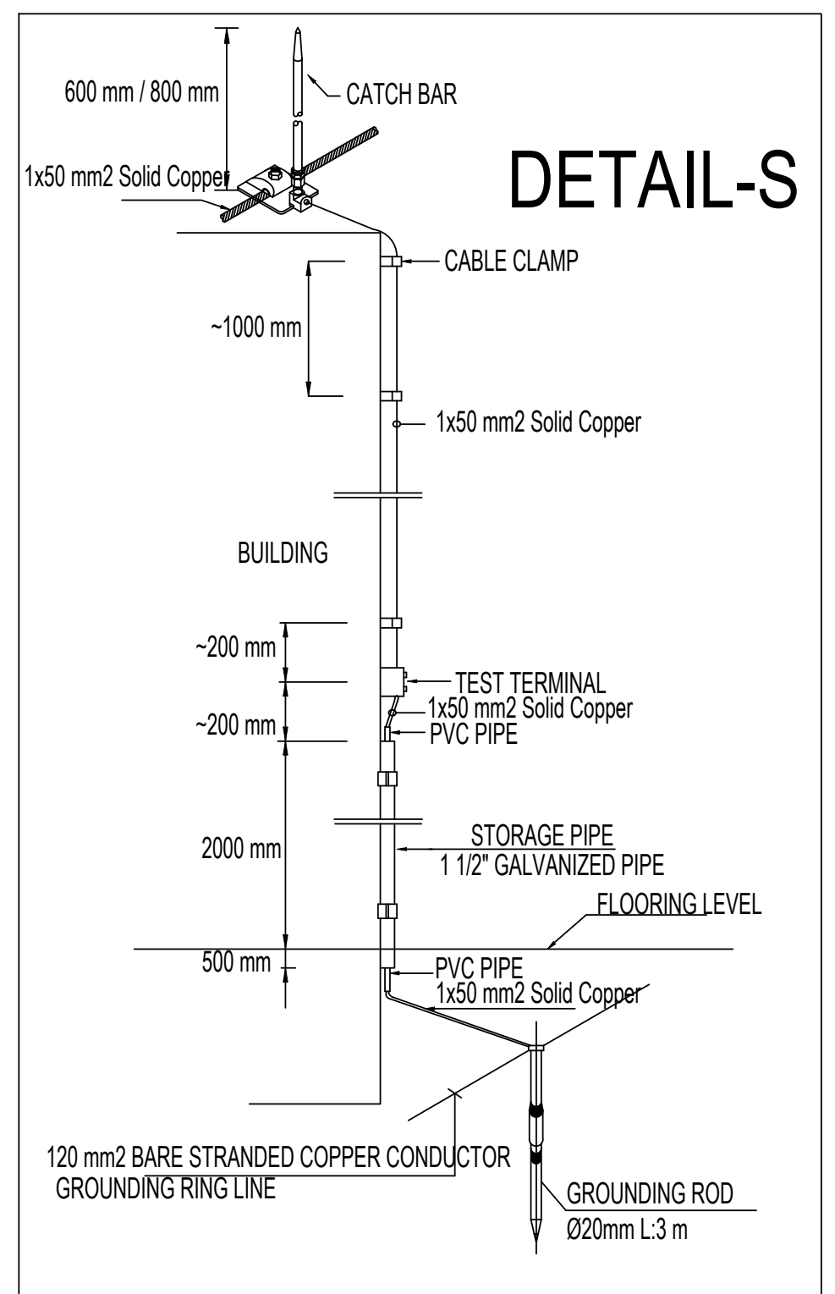
TYPICAL COLUMN CONNECTION DETAIL

DETAIL-L

SERIAL NO	EXPLANATIONS
①	120 mm2 BARE STRANDED COPPER CONDUCTOR
②	CADWELD WELDING
③	30x3.5mm GALVANIZED STRIP CONDUCTOR
④	120 mm2 BARE STRANDED COPPER CONDUCTOR
⑤	ELECTRICAL WELDING
⑥	300x40x5 mm COPPER BUSBAR (SEE DETAIL-A)
⑦	GALVANIZED STEEL GROUNDING PLATE (SEE DETAIL-G)
⑧	1'' GALVANIZED STEEL PIPE
⑨	CABLE LUGS CONNECTION
⑩	GROUNDING BUSBAR
⑪	BOLT AND NUT
⑫	CONNECTION TERMINAL (GALVANIZED STEEL)
⑬	FLEXIBLE CABLE CONNECTION (NYAF 50 mm2)
⑭	BUSBAR MOUNTING ELEMENT
⑮	STEEL COLUMN

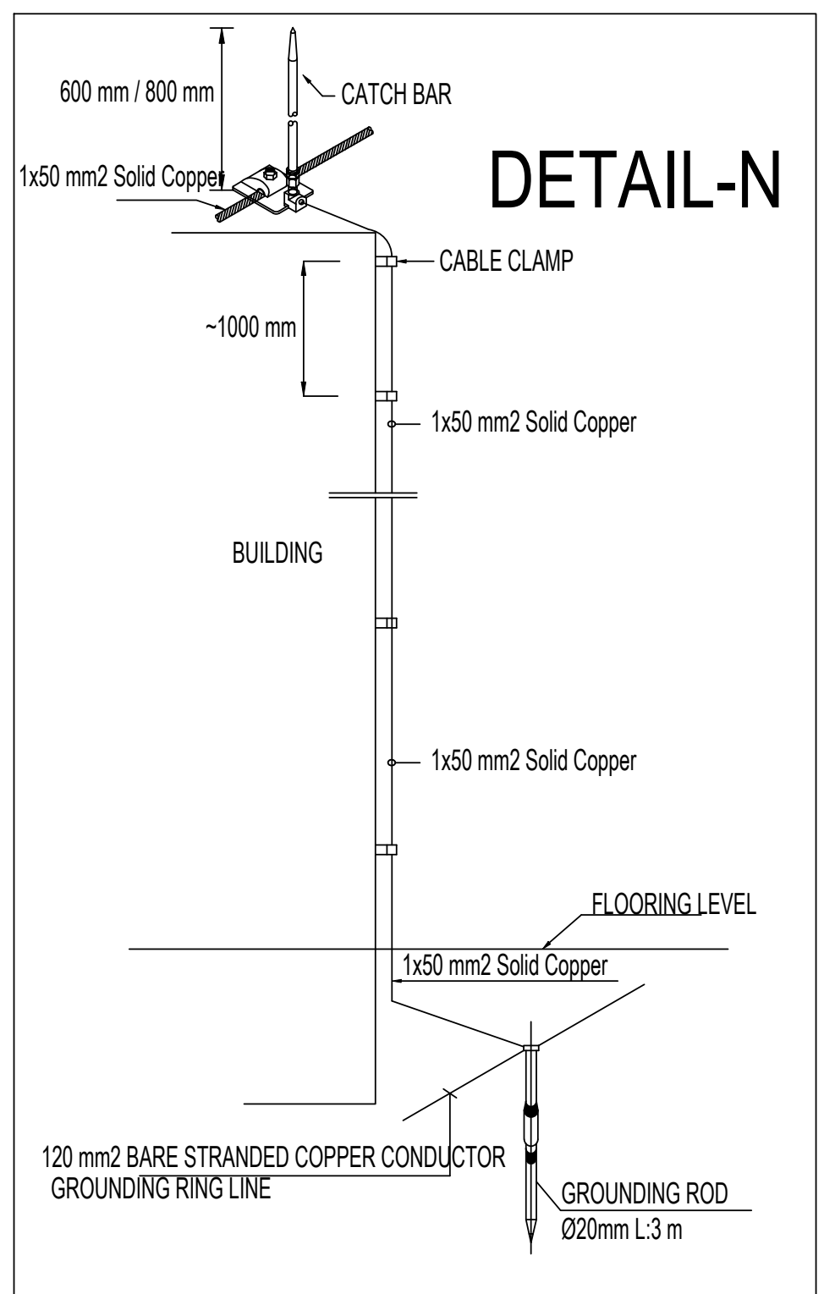

BAR MOUNTING ELEMENT (SEE DETAIL-H)
STEEL COLUMN
GROUNDING BAR
WELDING

GROUNDING BAR
(STEEL COLUMN MOUNTING) SECTION A-A
SECTION A-A


600 mm / 800 mm
CATCH BAR
1x50 mm2 Solid Copper
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
~200 mm
~200 mm
TEST TERMINAL
1x50 mm2 Solid Copper
PVC PIPE
2000 mm
STORAGE PIPE
1 1/2" GALVANIZED PIPE
FLOORING LEVEL
500 mm
PVC PIPE
1x50 mm2 Solid Copper
120 mm2 BARE STRANDED COPPER CONDUCTOR
GROUNDING RING LINE
GROUNDING ROD
Ø20mm L:3 m

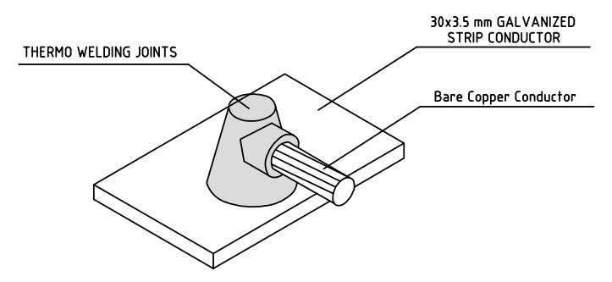
DETAIL-S

GROUNDING RING LANDING DETAIL


600 mm / 800 mm
CATCH BAR
1x50 mm2 Solid Copper
CABLE CLAMP
~1000 mm
1x50 mm2 Solid Copper
BUILDING
1x50 mm2 Solid Copper
FLOORING LEVEL
1x50 mm2 Solid Copper
120 mm2 BARE STRANDED COPPER CONDUCTOR
GROUNDING RING LINE
GROUNDING ROD
Ø20mm L:3 m

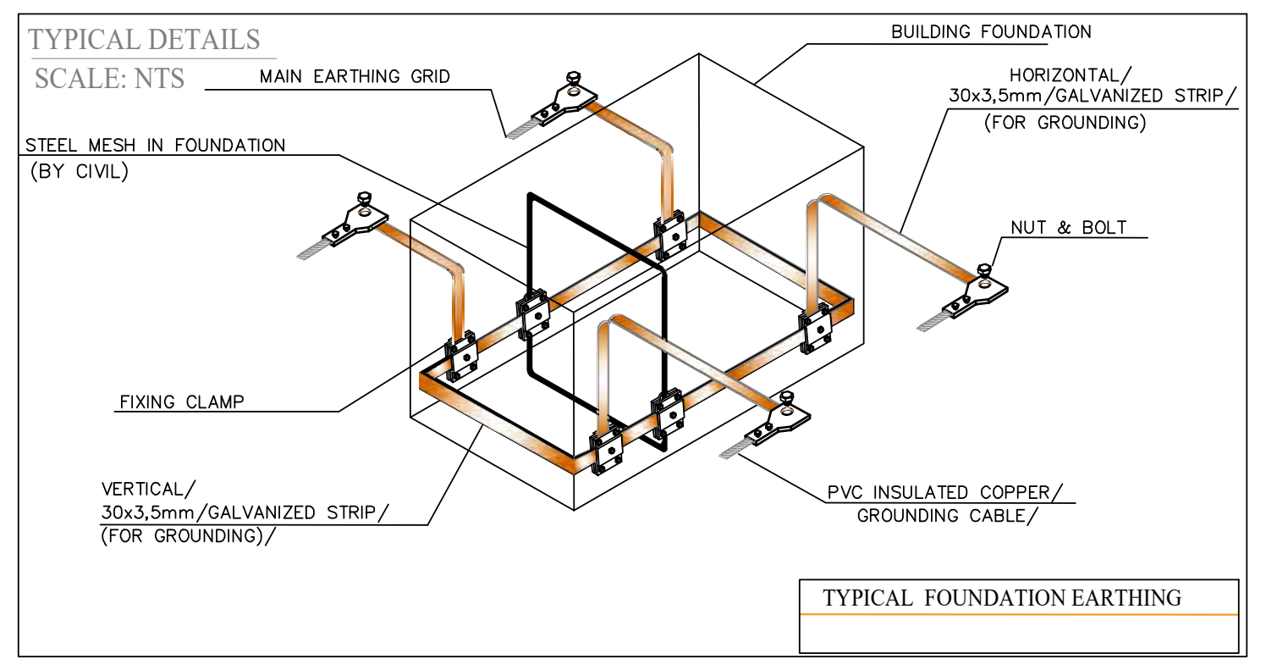
DETAIL-N

GROUNDING RING LANDING DETAIL

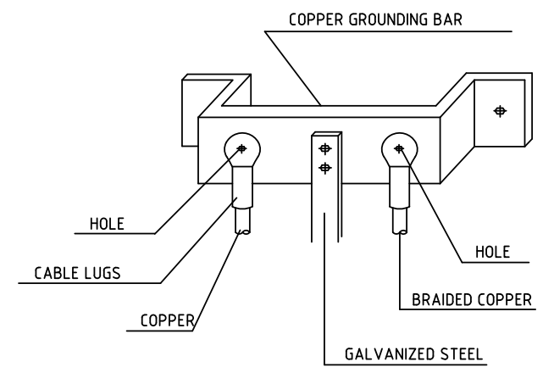

THERMO WELDING JOINTS
30x3.5 mm GALVANIZED STRIP CONDUCTOR
Bare Copper Conductor

DRAWING OF BARE COPPER THERMO WELDING
WITH TYPICAL 30x3.5 mm GALVANIZED STRIP

DETAIL -M
SCALE: NTS

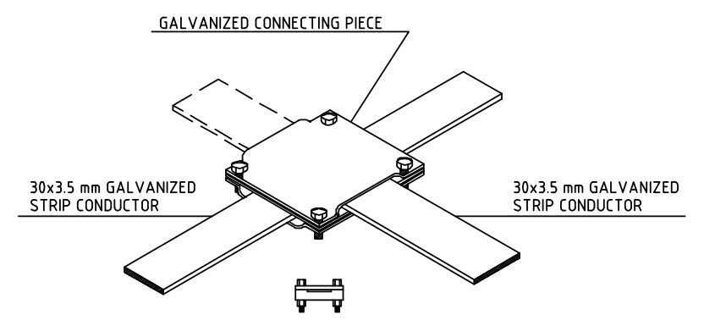

TYPICAL DETAILS
SCALE: NTS
MAIN EARTHING GRID
BUILDING FOUNDATION
HORIZONTAL/
30x3,5mm/GALVANIZED STRIP/
(FOR GROUNDING)
STEEL MESH IN FOUNDATION
(BY CIVIL)
NUT & BOLT
FIXING CLAMP
VERTICAL/
30x3,5mm/GALVANIZED STRIP/
(FOR GROUNDING)/
PVC INSULATED COPPER/
GROUNDING CABLE/
TYPICAL FOUNDATION EARTHING

DETAIL -W
SCALE: NTS


COPPER GROUNDING BAR
HOLE
CABLE LUGS
COPPER
HOLE
BRAIDED COPPER
GALVANIZED STEEL

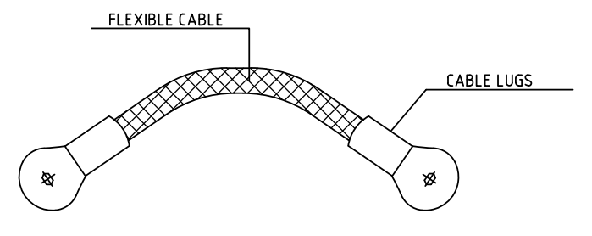
GROUNDING BAR
(WALL MOUNTING)

DETAIL -A
SCALE: NTS


GALVANIZED CONNECTING PIECE
30x3.5 mm GALVANIZED STRIP CONDUCTOR
30x3.5 mm GALVANIZED STRIP CONDUCTOR

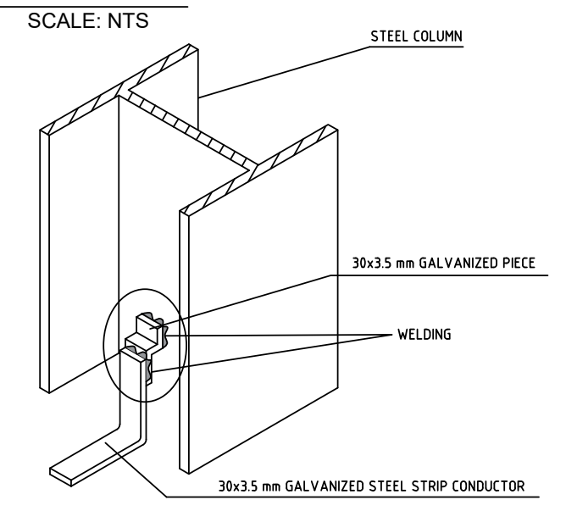
GALVANIZED CONNECTION PIECE
FOR STRIP-GALVANIZED STRIP

DETAIL -B
SCALE: NTS

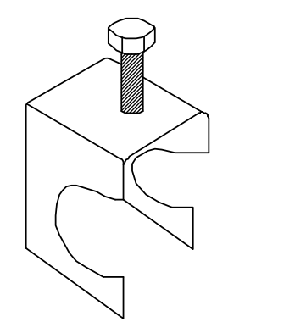

FLEXIBLE CABLE
CABLE LUGS

TYPICAL FLEXIBLE CONNECTOR

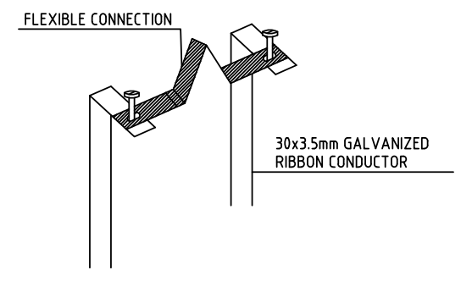
DETAIL-C
SCALE: NTS


STEEL COLUMN
30x3.5 mm GALVANIZED PIECE
WELDING
30x3.5 mm GALVANIZED STEEL STRIP CONDUCTOR

DETAIL"D"
SCALE: NTS



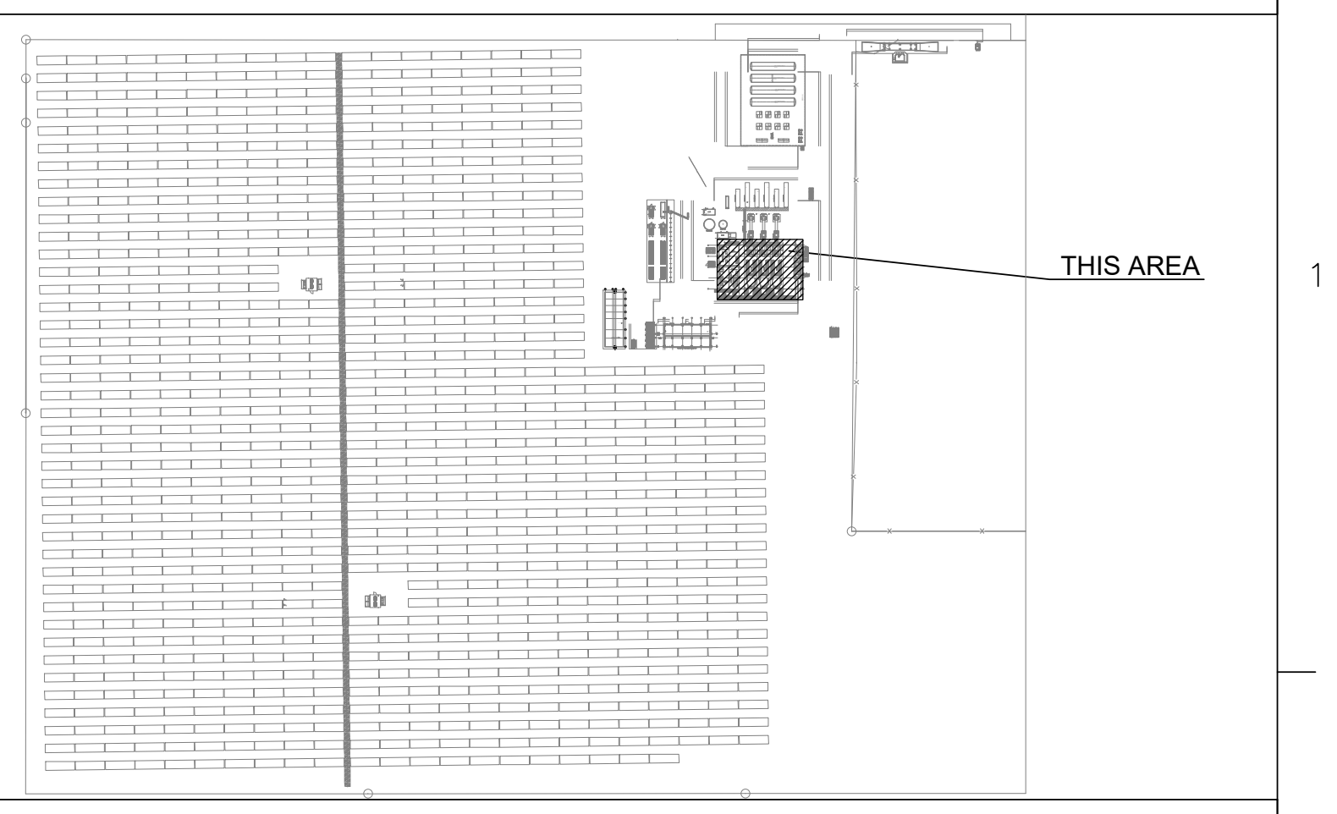
GALVANIZED STEEL CONNECTION PIECE
STRIP CONDUCTOR - FOR REINFORCEMENT


FLEXIBLE CONNECTION
30x3.5mm GALVANIZED RIBBON CONDUCTOR

DILATATION MODULE

DETAIL -F
SCALE: NTS

KEY-PLAN



REFERENCE DRAWINGS

LEGEND

SYMBOL LIST	
▭	Equipotential Busbars tinned - cooppers will have 3 holes.
▬	30x3,5 mm Galvanized Strip Conductor
—	1x120mm² Stranded Bare Copper Conductor
●	Cadvelt source
▨	Galvanized Steel Bolted Connector
⏚	L:3m Q=20 mm Electroltyte Copper Grounding Rod
□	Test Menhol

GENERAL NOTES

1. ±0.00 =2.50
2. ALL DIMENSIONS ARE IN MM , ELEVATIONS ARE IN M UNLESS NOTED.
3. ALL DIMENSIONS SHOULD BE CHECKED AT SITE BEFORE CONSTRUCTION. IN THE CASE OF ANY UNCERTANITY,DESIGNER SHOULD BE INFORMED.
4. BEFORE CONSTRUCTION ,THIS DRAWING SHOULD BE CHECKED WITH RELATED OTHER DISIPLINES DOCUMENTS SUCH AS MECHANICAL DRAWINGS,
5. FOR THE UNDETERMINED DIMENSIONS , CONSULT THE DESIGNER. DO NOT MEASURE ANY DIMENSION FROM DRAWING
6. GRID EYES NO GREATER THAN 10m x 10m WITHIN THE FLOOR CONCRETE AND THE OUTLETS SHOWN IN THE PLAN AND DETAILS WILL BE MADE WITH GALVANIZED STEEL GROUNDING CONDUCTORS. THE DISTANCE OF THE UNDERGROUND RING GROUNDING CONDUCTOR AROUND THE CONCRETE FOUNDATIONS FROM THE CONCRETE SHALL NOT BE LESS THAN 1m, AND ITS DEPTH IN THE GROUND SHALL NOT BE LESS THAN 80cm.
7. GROUNDING INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE RELEVANT STANDARDS.
8. ALL BRANCHES REMAINING IN THE GROUND FROM THE MAIN GROUNDING LOOP WILL BE MADE WITH CADWELD WELDING.
9. IF THERE IS A CONNECTION BETWEEN STEEL STRUCTURES WITH INSULATING MATERIAL (SEALING, ETC.), A FLEXIBLE GROUNDING ELEMENT WILL BE USED FOR ELECTRICAL CONTINUITY. (SEE DETAIL-C)
10. ALL STEEL COLUMNS WILL BE GROUNDED USING BRANCHES TAKEN FROM THE GROUNDING CONDUCTOR AT THEIR FOUNDATIONS. ALL STEEL COMPONENTS, EXCEPT FOR THE MAIN STEEL COLUMNS OF THE BUILDING, PLATFORM CARRYING COLUMNS, STEEL PLATFORMS, EQUIPMENT CARRYING PLATFORMS (ETC.), WILL BE CONNECTED TO THE GROUNDING SYSTEM.
11. ALL CABLE TURNS WILL BE GREATER THAN 90°.
12. CONTINUOUS STEEL COMPONENTS WILL BE GROUNDED AT MAXIMUM 20-M INTERVALS.
13. WHEN WELDED CONNECTIONS ON STEEL STRUCTURES ARE REQUIRED, THE SURFACE WILL BE CLEANED BEFORE WELDING.
14. IF THE GROUNDING ROD IS USED WITHOUT A TEST HENDHOLE, ITS UPPER LEVEL WILL BE AT A DEPTH OF MIN. 800 mm FROM THE GROUND LEVEL AND THE CONNECTION TO THE MAIN RING WILL BE MADE WITH CADWELD.
15. GROUNDING SYSTEM TRANSITION RESISTANCE WILL BE MAXIMUM 0.2 OHM. IF NECESSARY, AN GROUNDING STAKE WILL BE ADDED AFTER MEASUREMENT.
16. GROUNDING CONDUCTOR IN THE CONCRETE WILL BE CONTINUED WITH THE EXPANSION CONNECTION ELEMENT AT THE EXPANSION PASSAGES. (SEE DETAIL-F)
17. GALVANIZED GROUNDING STRIP WILL BE FIXED TO THE REINFORCED CONCRETE REBAR AT 1.5-M INTERVALS. (SEE DETAIL-E)
18. THE FINAL LOCATIONS AND NUMBER OF OUTLETS AND BUSBAR PLACES SHOWN IN THE PROJECT WILL BE CLEARED DURING IMPLEMENTATION.
19. EQUIPMENT GROUNDING WILL BE DONE DURING IMPLEMENTATION USING PROPERLY CROSS-SECTION BRANCHES TAKEN FROM THE LOCATIONS OF THE CLOSEST GROUNDING OUTLETS.(Düzenlendi)
20. Grounding bars used on the surface. Stainless steel bolts will be used.
21. Equipotential Busbars will have 3 holes.
22. Before commisioning continuty and fall-of potential tests shall be condcuted.

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

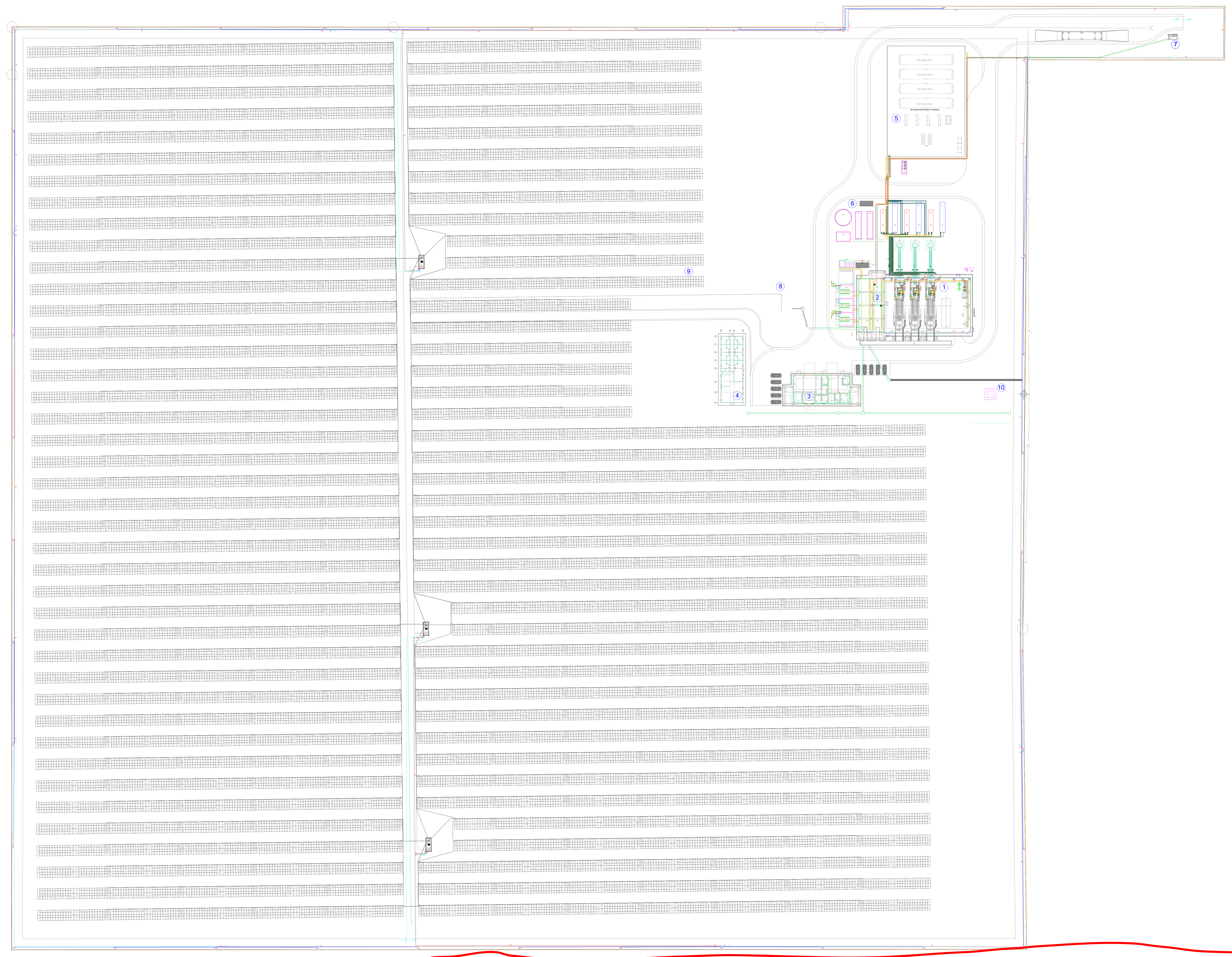
SIZE	SCALE
1A0	1/1

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
0	26.12.25	FOR APPROVAL	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-DRW-2306

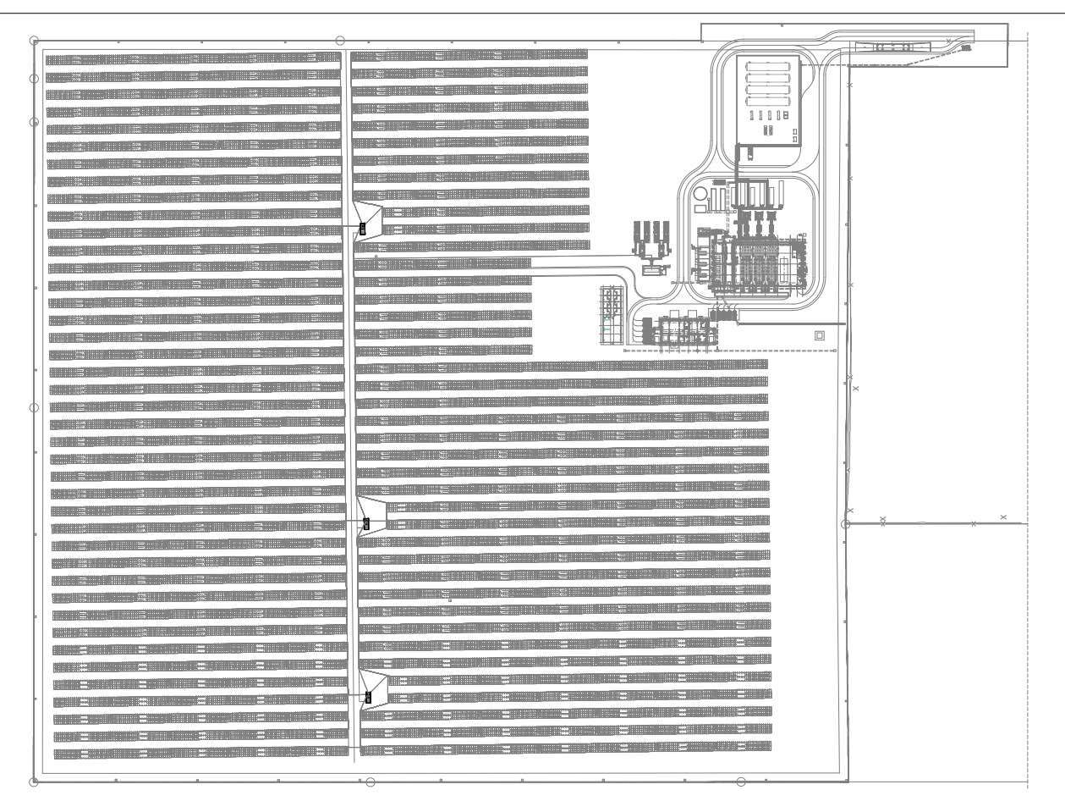
SHEET:
2
OF:
2

DRAWING NAME:
MACHINE HALL AND ELECTRICAL & CONTROL BUILDING
FOUNDATION GROUNDING PLANS



THIS DRAWING IS THE SAME AS THAT SHOWN IN THE FOLDER FENCE CCVT LAYOUT-SPECIFICATION-PDF_ARCH_E
AS: ABA-ENG-ELC-DRW-3110-REV.1-FENCE CCVT SYSTEM LAYOUT & RISER DRAWING LAYOUT.
DUPLICATE DRAWINGS WITH SAME NAMES: WHICH ONE WILL BE USED FOR THE PROJETC?

KEY-PLAN



REFERENCE DRAWINGS

1. ABA-ENG-ELC-SPE-3110 CCTV SYSTEM SPECIFICATION
2. ABA-ENG-I&C-SPE-0001 INSTRUMENTATION AND CONTROL DESIGN CRITERIA
3. ABA-ENG-ELC-DAT-3070 INSTRUMENTATION & CONTROL CABLE DATASHEET

LEGEND

○ LIGHTING POLE
CAMERA
CCTV BOX CLOSED-CIRCUIT TELEVISION BOX
● DUCT BANK
POWER CABLE (CROSS-SECTIONS AS INDICATED ON THE DRAWING)
CAT 6 CABLE (to CAMERA)
FIBER OPTIC CABLE (4x9/125 OS2 SM-FO)

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS OTHERWISE NOTED
3. CAMERA TYPE AND QUANTITIES SHALL BE CHECKED AND UPDATED BY THE VENDOR IN ACCORDANCE WITH THEIR COVERAGE CALCULATIONS AND PROPOSED EQUIPMENTS FEATURES

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iLTEKNO
ADVANCED TECHNOLOGY - POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

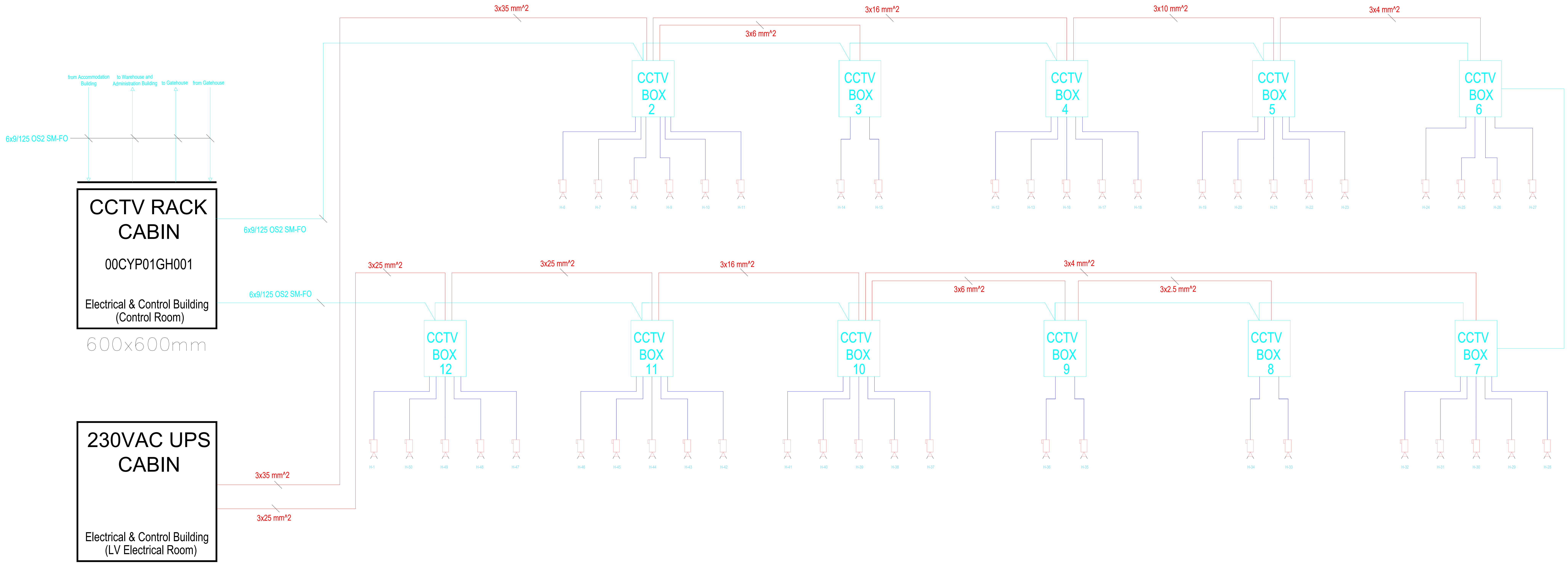
ISSUE OWNER

SIZE	SCALE
A0	-

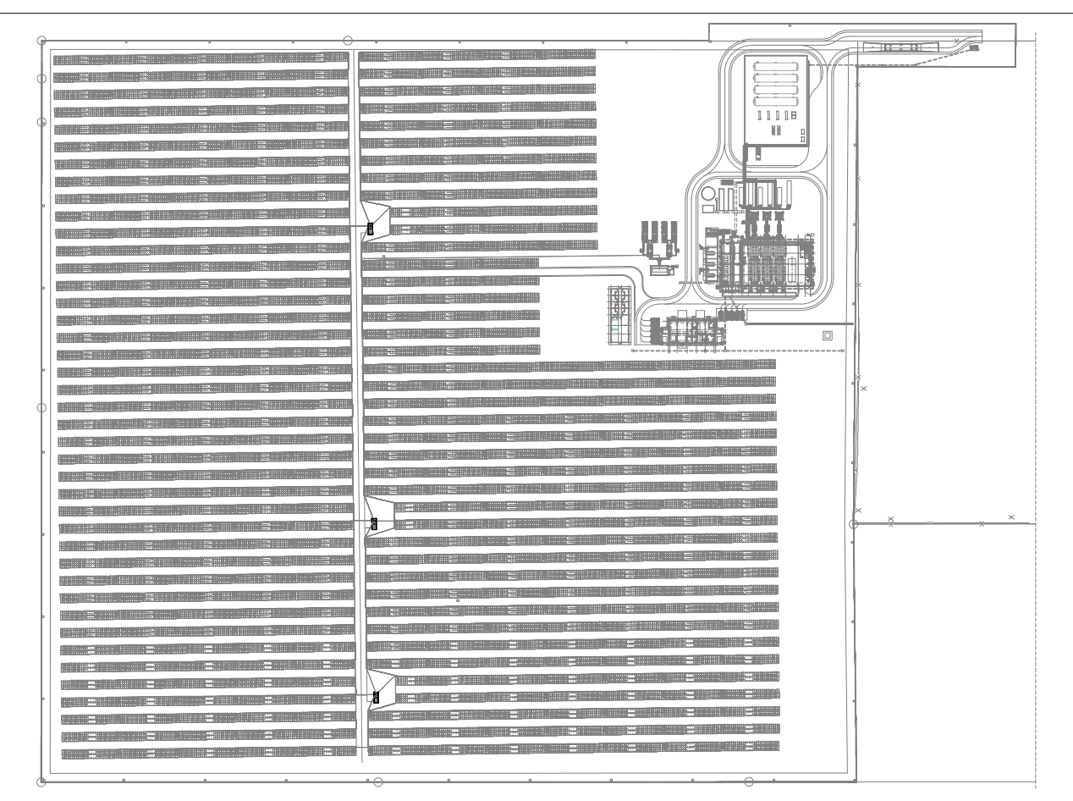
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	10.02.2026	FOR APPROVAL	H.N.K	E.D	M.S
0	08.01.2026	FOR APPROVAL	H.N.K	E.D	C.U

DRAWING NUMBER: ABA-ENG-ELC-DRW-3110
SHEET: 1
OF: 3
DRAWING NAME: FENCE CCTV SYSTEM LAYOUT & RISER DRAWING

FENCE CCTV SYSTEM RISER


from Accommodation Building
to Warehouse and Administration Building
to Gatehouse
from Gatehouse
6x9/125 OS2 SM-FO
CCTV RACK CABIN
00CYP01GH001
Electrical & Control Building (Control Room)
600x600mm
6x9/125 OS2 SM-FO
6x9/125 OS2 SM-FO
230VAC UPS CABIN
Electrical & Control Building (LV Electrical Room)
3x35 mm^2
3x25 mm^2
3x35 mm^2
3x16 mm^2
3x10 mm^2
3x4 mm^2
3x6 mm^2
CCTV BOX 2
CCTV BOX 3
CCTV BOX 4
CCTV BOX 5
CCTV BOX 6
H-6
H-7
H-8
H-9
H-10
H-11
H-14
H-15
H-12
H-13
H-16
H-17
H-18
H-19
H-20
H-21
H-22
H-23
H-24
H-25
H-26
H-27
3x25 mm^2
3x25 mm^2
3x16 mm^2
3x4 mm^2
3x6 mm^2
3x2.5 mm^2
CCTV BOX 12
CCTV BOX 11
CCTV BOX 10
CCTV BOX 9
CCTV BOX 8
CCTV BOX 7
H-1
H-50
H-49
H-48
H-47
H-46
H-45
H-44
H-43
H-42
H-41
H-40
H-39
H-38
H-37
H-36
H-35
H-34
H-33
H-32
H-31
H-30
H-29
H-28

KEY-PLAN



REFERENCE DRAWINGS

1. ABA-ENG-ELC-SPE-3110 CCTV SYSTEM SPECIFICATION
2. ABA-ENG-I&C-SPE-0001 INSTRUMENTATION AND CONTROL DESIGN CRITERIA
3. ABA-ENG-ELC-DAT-3070 INSTRUMENTATION & CONTROL CABLE DATASHEET

LEGEND

○	LIGHTING POLE
▨	CAMERA
CCTV BOX	CLOSED-CIRCUIT TELEVISION BOX
●	DUCT BANK
→	POWER CABLE (CROSS-SECTIONS AS INDICATED ON THE DRAWING)
→	CAT 6 CABLE (to CAMERA)
→	FIBER OPTIC CABLE (4x9/125 OS2 SM-FO)

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS OTHERWISE NOTED
3. CAMERA TYPE AND QUANTITIES SHALL BE CHECKED AND UPDATED BY THE VENDOR IN ACCORDANCE WITH THEIR COVERAGE CALCULATIONS AND PROPOSED EQUIPMENTS FEATURES

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CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

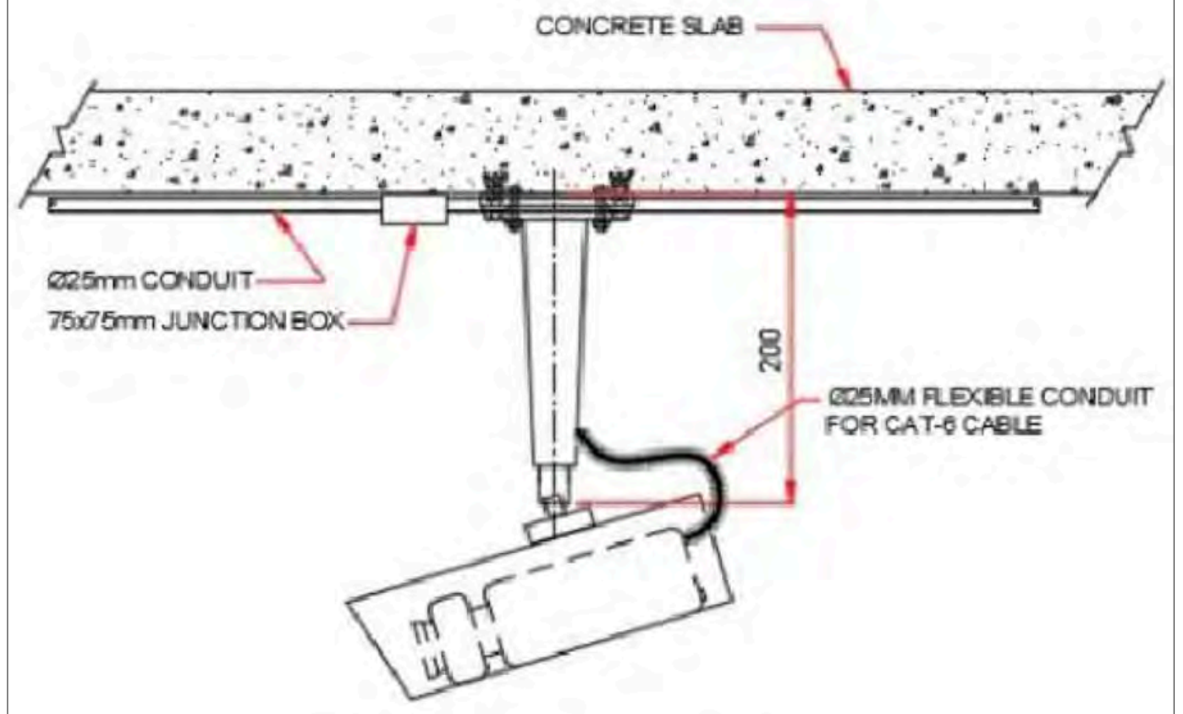
SIZE	SCALE
A0	-

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	10.02.2026	FOR APPROVAL	H.N.K	E.D	M.S
0	08.01.2026	FOR APPROVAL	H.N.K	E.D	C.U

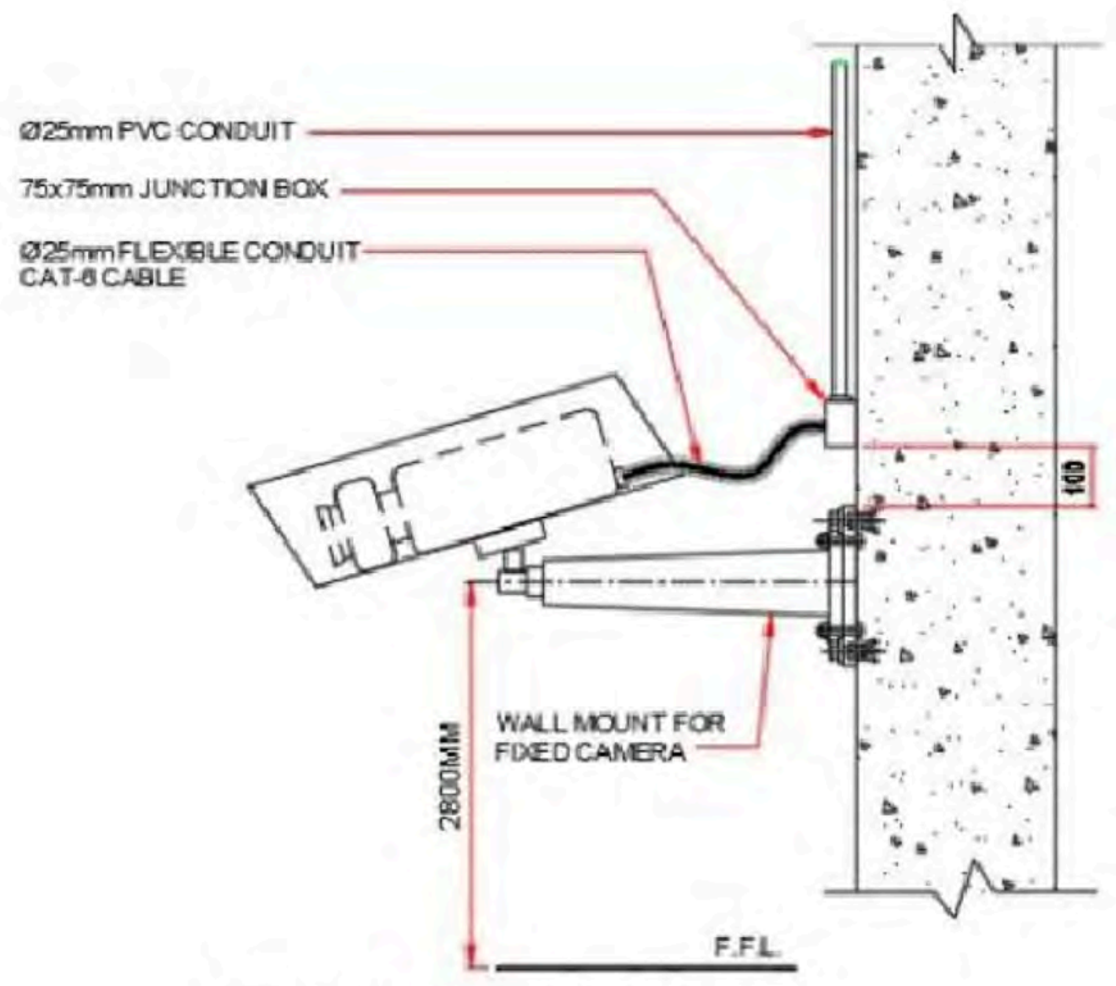
DRAWING NUMBER: ABA-ENG-ELC-DRW-3110

SHEET: 2
OF: 3

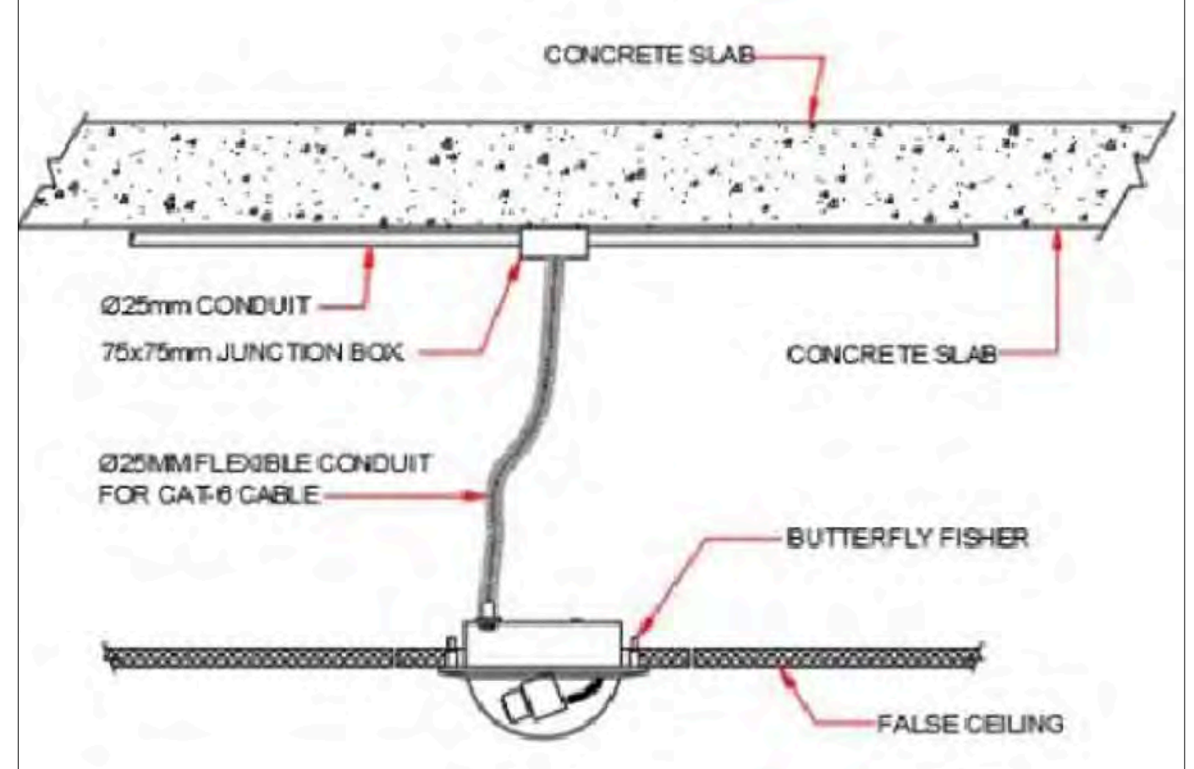
DRAWING NAME: FENCE CCTV SYSTEM LAYOUT & RISER DRAWING


CONCRETE SLAB
Ø25mm CONDUIT
75x75mm JUNCTION BOX
200
Ø25MM FLEXIBLE CONDUIT FOR CAT-6 CABLE

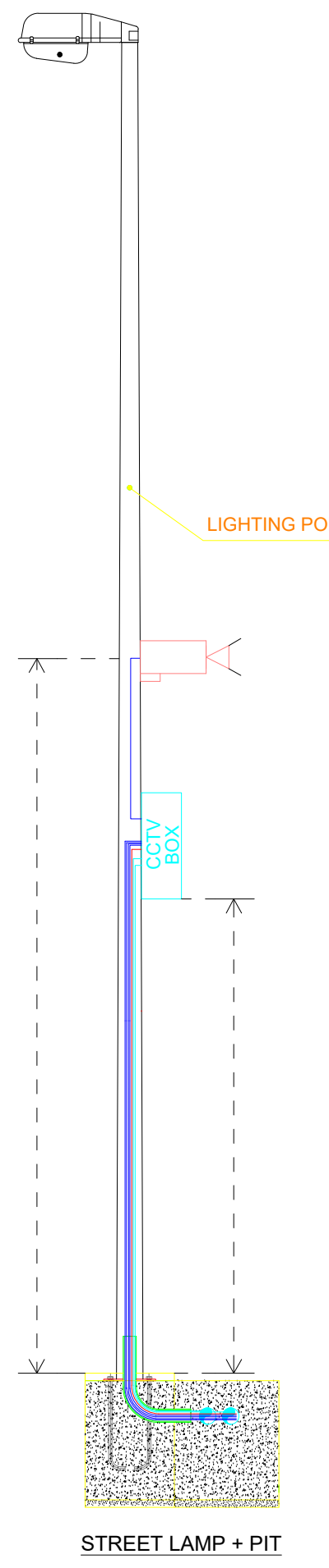
TYPICAL INSTALLATION DETAIL
FOR CEILING MOUNTED FIXED CAMERA


Ø25mm PVC CONDUIT
75x75mm JUNCTION BOX
Ø25mm FLEXIBLE CONDUIT CAT-6 CABLE
100
WALL MOUNT FOR FIXED CAMERA
2800MM
F.F.L.

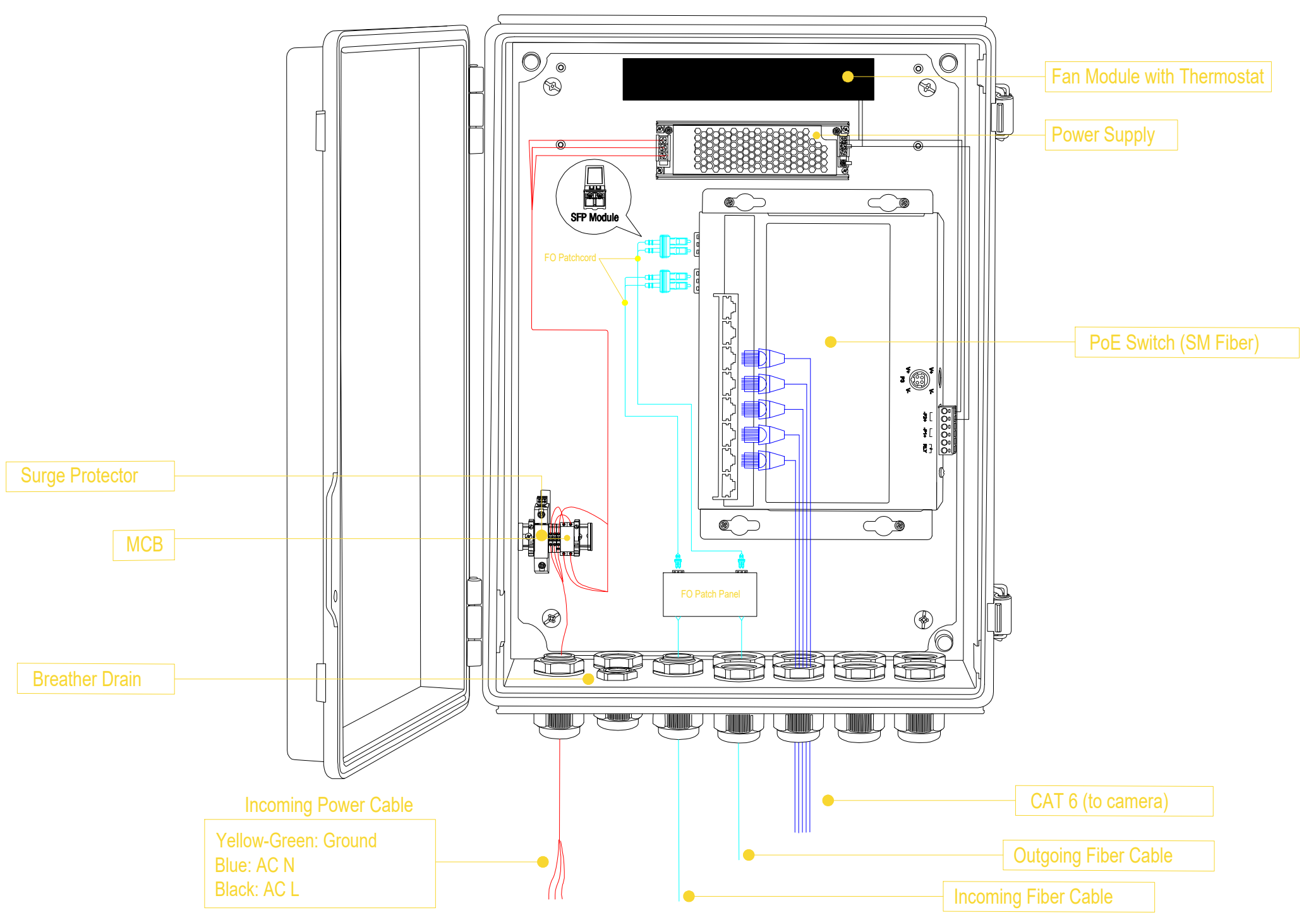
TYPICAL INSTALLATION DETAIL
FOR WALL MOUNTED FIXED CAMERA


CONCRETE SLAB
Ø25mm CONDUIT
75x75mm JUNCTION BOX
CONCRETE SLAB
Ø25MM FLEXIBLE CONDUIT FOR CAT-6 CABLE
BUTTERFLY FISHER
FALSE CEILING

TYPICAL INSTALLATION DETAIL FOR TILE CEILING MOUNTED
DOME CAMERA INDOOR FIXED TYPICAL

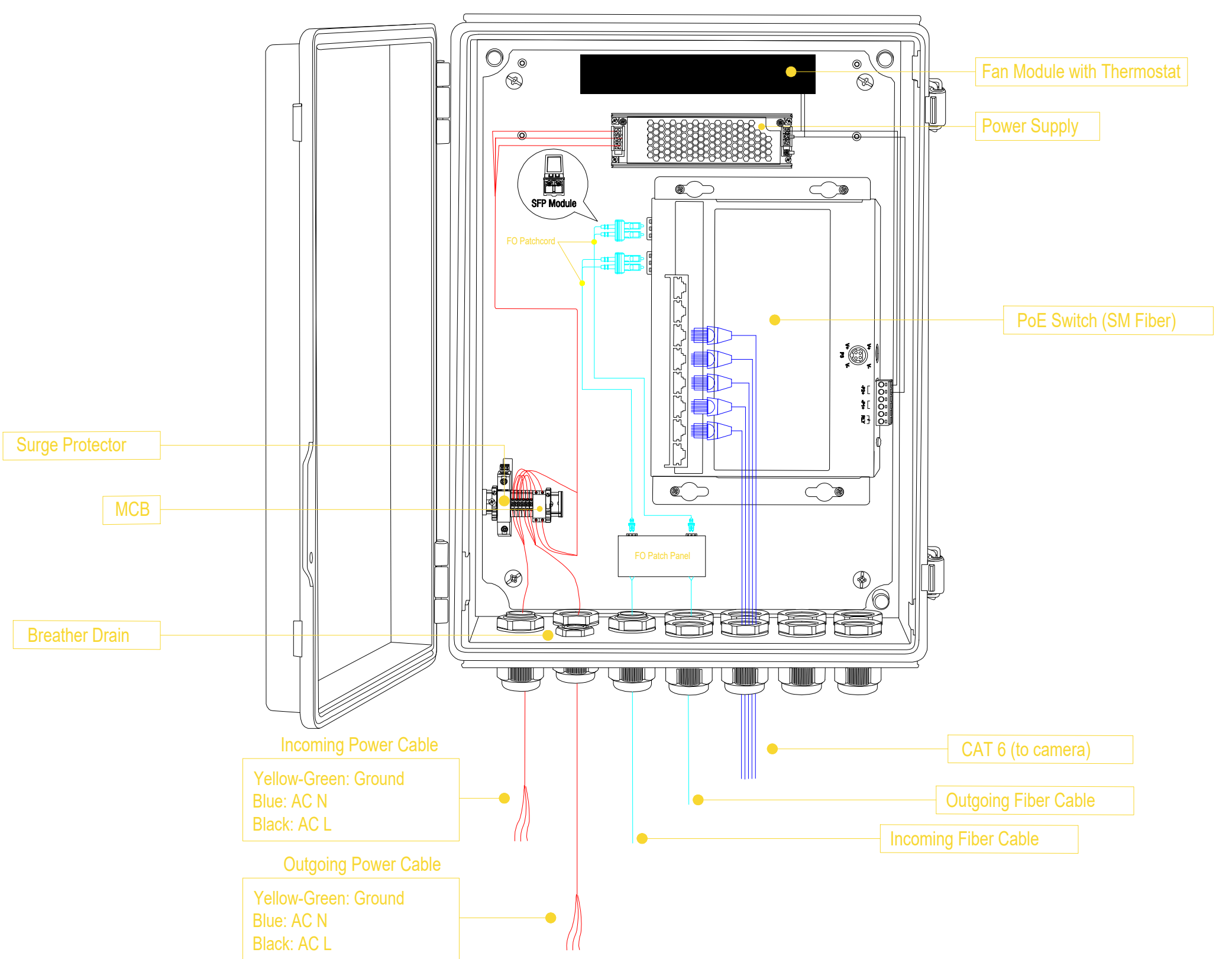

LIGHTING POLE
CCTV BOX
STREET LAMP + PIT

TYPICAL INSTALLATION DETAIL FOR
POLE MOUNTED FIXED CAMERA


Fan Module with Thermostat
Power Supply
SFP Module
FO Patchcord
PoE Switch (SM Fiber)
Surge Protector
MCB
FO Patch Panel
Breather Drain
Incoming Power Cable
Yellow-Green: Ground
Blue: AC N
Black: AC L
CAT 6 (to camera)
Outgoing Fiber Cable
Incoming Fiber Cable

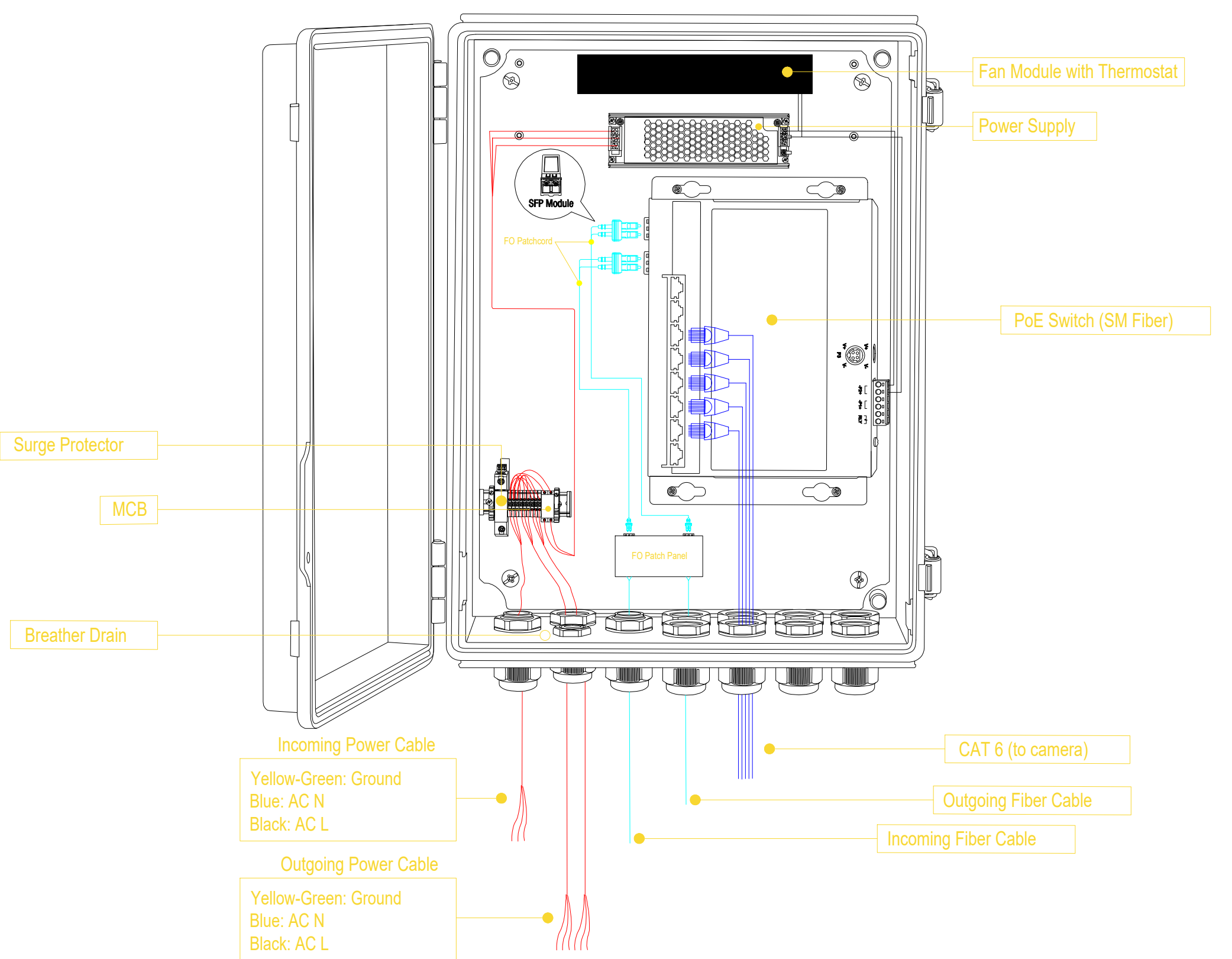
TYPICAL INSTALLATION DETAIL FOR
CCTV BOX (TYPE-1)

CCTV BOX-3 / CCTV BOX-6 / CCTV BOX-7 / CCTV BOX-8


Fan Module with Thermostat
Power Supply
SFP Module
FO Patchcord
PoE Switch (SM Fiber)
Surge Protector
MCB
FO Patch Panel
Breather Drain
Incoming Power Cable
Yellow-Green: Ground
Blue: AC N
Black: AC L
Outgoing Power Cable
Yellow-Green: Ground
Blue: AC N
Black: AC L
CAT 6 (to camera)
Outgoing Fiber Cable
Incoming Fiber Cable

TYPICAL INSTALLATION DETAIL FOR
CCTV BOX (TYPE-2)

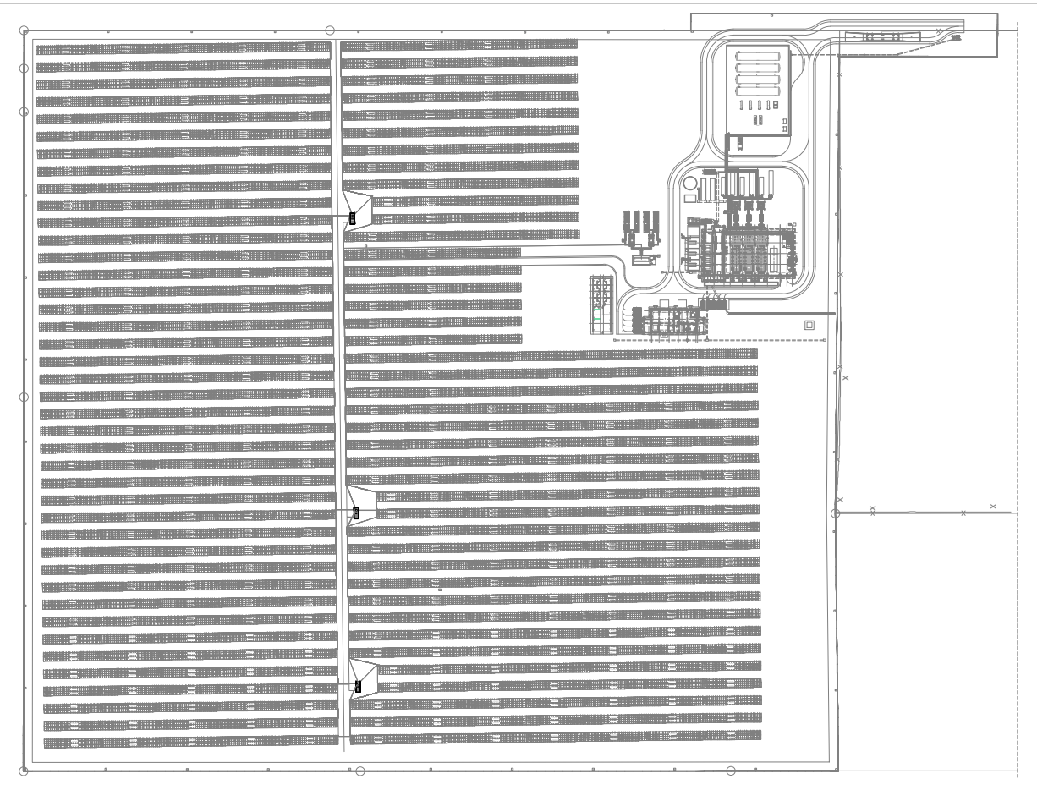
CCTV BOX-4 / CCTV BOX-5 / CCTV BOX-9 / CCTV BOX-11 / CCTV BOX-12


Fan Module with Thermostat
Power Supply
SFP Module
FO Patchcord
PoE Switch (SM Fiber)
Surge Protector
MCB
FO Patch Panel
Breather Drain
Incoming Power Cable
Yellow-Green: Ground
Blue: AC N
Black: AC L
Outgoing Power Cable
Yellow-Green: Ground
Blue: AC N
Black: AC L
CAT 6 (to camera)
Outgoing Fiber Cable
Incoming Fiber Cable

TYPICAL INSTALLATION DETAIL FOR
CCTV BOX (TYPE-3)

CCTV BOX-2 / CCTV BOX-10

KEY-PLAN



REFERENCE DRAWINGS

1. ABA-ENG-ELC-SPE-3110 CCTV SYSTEM SPECIFICATION
2. ABA-ENG-I&C-SPE-0001 INSTRUMENTATION AND CONTROL DESIGN CRITERIA
3. ABA-ENG-ELC-DAT-3070 INSTRUMENTATION & CONTROL CABLE DATASHEET

LEGEND

○	LIGHTING POLE
▨	CAMERA
CCTV BOX	CLOSED-CIRCUIT TELEVISION BOX
◐	DUCT BANK
—	POWER CABLE (CROSS-SECTIONS AS INDICATED ON THE DRAWING)
—	CAT 6 CABLE (to CAMERA)
—	FIBER OPTIC CABLE (4x9/125 OS2 SM-FO)

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS OTHERWISE NOTED
3. CAMERA TYPE AND QUANTITIES SHALL BE CHECKED AND UPDATED BY THE VENDOR IN ACCORDANCE WITH THEIR COVERAGE CALCULATIONS AND PROPOSED EQUIPMENTS FEATURES

CLIENT
EA Energy

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
n22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
A0	-

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	10.02.2026	FOR APPROVAL	H.N.K	E.D	M.S
0	08.01.2026	FOR APPROVAL	H.N.K	E.D	M.S

DRAWING NUMBER: ABA-ENG-ELC-DRW-3110
SHEET: 3
OF: 3
DRAWING NAME: FENCE CCTV SYSTEM LAYOUT & RISER DRAWING

CLIENT

EA Energy

CONTRACTOR

iLTEKNO

DESIGNER

n22®

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

0	21.01.2026	FOR APPROVAL	M.G.	C.U	M.S
REV	***DATE***	***DESCRIPTION***	***DONE***	***CHECKED***	***APPROVED***

STATUS	FOR INFORMATION FOR REVIEW FOR APPROVAL VALID FOR DESIGN VALID FOR PURCHASE PROCESS VALID FOR CONSTRUCTION AS BUILT	***ISSUE OWNER*** n22®	SIGN	DATE

DOCUMENT NUMBER **ABA-ENG-ELC-LST-2120**	***DOCUMENT NAME*** **MV CABLE LIST**

NO	KKS CODE	NAME	FROM	FEEDER NO	VOLTAGE (kV)	PHASE	POWER (kW)	cos(ϕ) [1]	APPARENT POWER (kVA)	REACTIVE POWER (kVAr)	CURRENT (A) [2]	DERATING FACTOR (k)	CURRENT CAPCITY (A)	LENGTH (m)	# CORES	CABLE	R @90 °C (Ohm)	Xl (Ohm)	CURRENT CAPACITY (A)	CAPACITY RATIO	VOLTAGE DROP (V)	SHORT CIRCUIT (kA) [3]	PROTECTION TIME (s) [4]	Smin (mm2)	current capacity	minimum cross section	voltage drop (<3%)
1	00BBA001GA001	INCOMER	MV SWGR	1	34,5	3	-65.731,33	**0,80**	82.164,16	-49.298,50	**1.375,00**	0,728	875	400	3	35 kV CU UG (trefoil) 1 x 630 / 35	0,005	0,023	1911,00	71,95%	42,26	7,68	1	53,71	OK	OK	0,12%
2	00BBA001GA002	INCOMER	MV SWGR	2	34,5	3	-65.731,33	**0,80**	82.164,16	-49.298,50	**1.375,00**	0,728	875	400	3	35 kV CU UG (trefoil) 1 x 630 / 35	0,005	0,023	1911,00	71,95%	42,26	7,68	1	53,71	OK	OK	0,12%
3		METERING	MV SWGR	3	34,5	3																					
4	00BBA001GA004	AUX TRANSFORMER	MV SWGR	4	34,5	3	1.800,00	**0,80**	**2.000,00**	1.350,00	36,82	0,819	641	45	1	35 kV CU (trefoil) 1 x 240 / 25	0,004	0,006	524,98	7,01%	0,46	7,67	1	53,64	OK	OK	0,00%
5	00BBA001GA005	GSUT - 1	MV SWGR	5	34,5	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	257,72	0,819	641	30	1	35 kV CU (trefoil) 1 x 240 / 25	0,003	0,004	524,98	49,09%	2,17	6,88	1	48,11	OK	OK	0,01%
6	00BBA001GA006	GSUT - 2	MV SWGR	6	34,5	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	257,72	0,819	641	36	1	35 kV CU (trefoil) 1 x 240 / 25	0,003	0,005	524,98	49,09%	2,60	6,88	1	48,11	OK	OK	0,01%
7	00BBA001GA007	GSUT - 3	MV SWGR	7	34,5	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	257,72	0,819	641	42	1	35 kV CU (trefoil) 1 x 240 / 25	0,004	0,006	524,98	49,09%	3,04	6,88	1	48,11	OK	OK	0,01%
8	00BBA001GA008	SPP	MV SWGR	8	34,5	3	-18.000,00	**0,80**	**22.500,00**	-13.500,00	414,19	0,970	453	100	2	35 kV CU (trefoil) 1 x 240 / 25	0,005	0,007	878,82	47,13%	5,81	7,66	1	53,57	OK	OK	0,02%
11	10MKA001GA001	GENSET - 1	GSUT - 1		13,8	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	644,29	0,738	641	70	2	35 kV CU (trefoil) 1 x 240 / 25	0,003	0,005	946,12	68,10%	6,32	7,58	1	53,01	OK	OK	0,05%
12	20MKA001GA001	GENSET - 2	GSUT - 2		13,8	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	644,29	0,738	641	83	2	35 kV CU (trefoil) 1 x 240 / 25	0,004	0,006	946,12	68,10%	7,50	7,58	1	53,01	OK	OK	0,05%
13	30MKA001GA001	GENSET - 3	GSUT - 3		13,8	3	-11.200,00	**0,80**	**14.000,00**	-8.400,00	644,29	0,738	641	96	2	35 kV CU (trefoil) 1 x 240 / 25	0,005	0,007	946,12	68,10%	8,67	7,58	1	53,01	OK	OK	0,06%
21	10MKA001GA010	NGR - 1	GENSET - 1		7,97	1	219,10	**1,00**	219,10	0,00	**27,50**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,01	1	0,07		OK	
22	20MKA001GA010	NGR - 2	GENSET - 2		7,97	1	219,10	**1,00**	219,10	0,00	**27,50**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,01	1	0,07		OK	
23	30MKA001GA010	NGR - 3	GENSET - 3		7,97	1	219,10	**1,00**	219,10	0,00	**27,50**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,01	1	0,07		OK	
31	10UBF001GA010	GSUT NGR - 1	GSUT - 1		19,92	1	21.910,44	**1,00**	21.910,44	0,00	**1.100,00**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,59	1	4,13		OK	
32	20UBF001GA010	GSUT NGR - 2	GSUT - 2		19,92	1	21.910,44	**1,00**	21.910,44	0,00	**1.100,00**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,59	1	4,13		OK	
33	30UBF001GA010	GSUT NGR - 3	GSUT - 3		19,92	1	21.910,44	**1,00**	21.910,44	0,00	**1.100,00**		641	10	1	35 kV CU (flat) 1 x 240 / 25						0,59	1	4,13		OK	

Reference values for cable current capacity selection are marked with bold.

For NGRs, only withstood energy has been checked, since there is no continuous load current, but fault current to flow.

[1] For GSUT, however Generator rating is lower, transformer capacity and generator limit pf value has been used.

[2] Current values are increased by 10% for safety factor

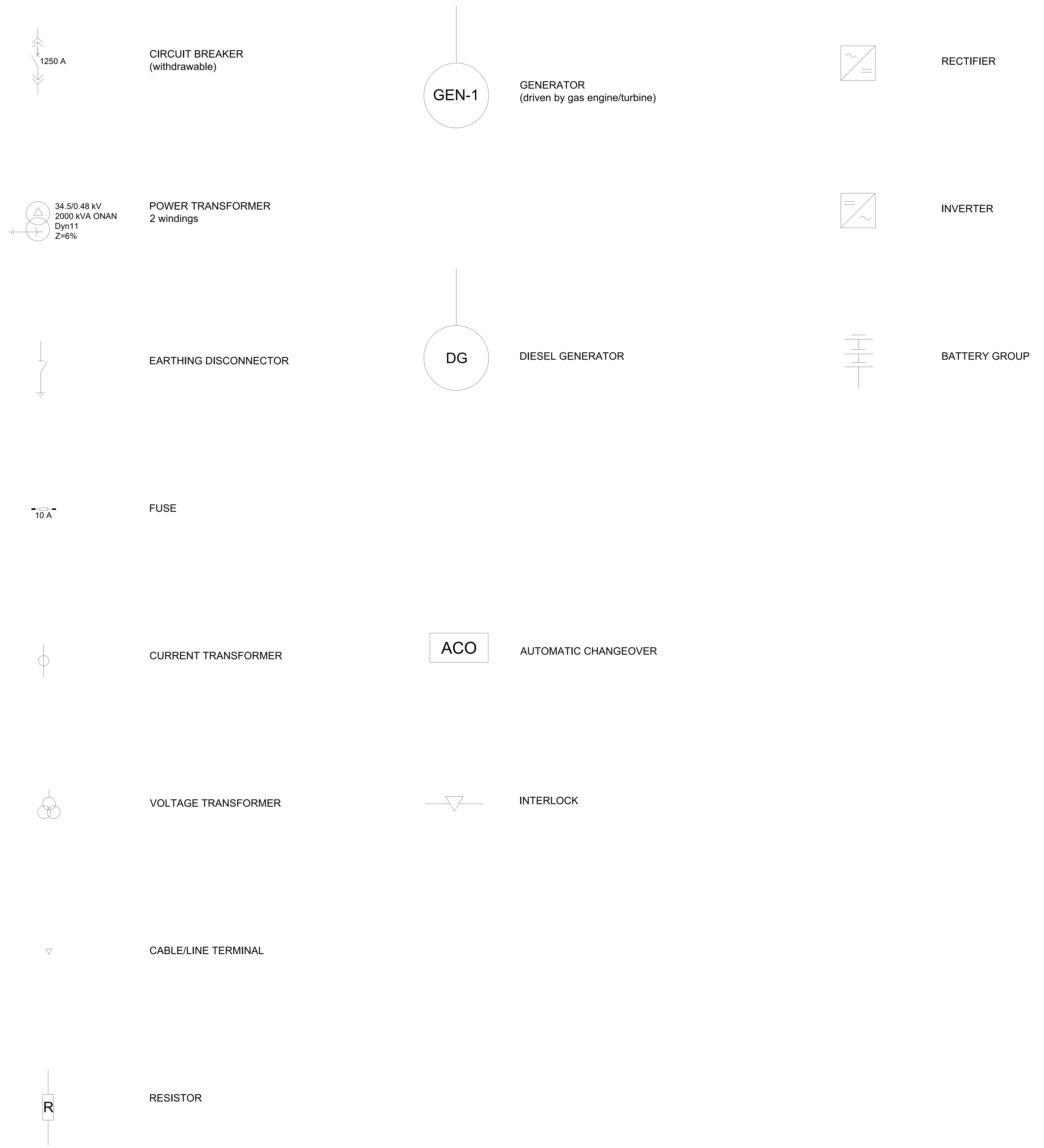
[3] Short circuit current values are based on ABA-ENG-ELC-CAL-0001 Rev. 0

[4] Maximum short circuit duartion has been taken as 1 second, regardless of actual protection time.

missing MV cables for BESS and for Solar PV systems

NO	NAME	FROM	PHASE	LENGTH (m)	# CORES	CABLE	CONFIGURATION	TOTAL LENGTH (m)
1	INCOMER	MV SWGR	3	400	3	35 kV CU UG (trefoil) 1 x 630 / 35	3 x 3 x (1 x 630 / 35)	3600
2	INCOMER	MV SWGR	3	400	3	35 kV CU UG (trefoil) 1 x 630 / 35	3 x 3 x (1 x 630 / 35)	3600
3	METERING	MV SWGR	3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
4	AUX TRANSFORMER	MV SWGR	3	45	1	35 kV CU (trefoil) 1 x 240 / 25	1 x 3 x (1 x 240 / 25)	135
5	GSUT - 1	MV SWGR	3	30	1	35 kV CU (trefoil) 1 x 240 / 25	1 x 3 x (1 x 240 / 25)	90
6	GSUT - 2	MV SWGR	3	36	1	35 kV CU (trefoil) 1 x 240 / 25	1 x 3 x (1 x 240 / 25)	108
7	GSUT - 3	MV SWGR	3	42	1	35 kV CU (trefoil) 1 x 240 / 25	1 x 3 x (1 x 240 / 25)	126
8	SPP	MV SWGR	3	100	2	35 kV CU (trefoil) 1 x 240 / 25	2 x 3 x (1 x 240 / 25)	600
11	GENSET - 1	GSUT - 1	3	70	2	35 kV CU (trefoil) 1 x 240 / 25	2 x 3 x (1 x 240 / 25)	420
12	GENSET - 2	GSUT - 2	3	83	2	35 kV CU (trefoil) 1 x 240 / 25	2 x 3 x (1 x 240 / 25)	498
13	GENSET - 3	GSUT - 3	3	96	2	35 kV CU (trefoil) 1 x 240 / 25	2 x 3 x (1 x 240 / 25)	576
21	NGR - 1	GENSET - 1	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10
22	NGR - 2	GENSET - 2	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10
23	NGR - 3	GENSET - 3	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10
31	GSUT NGR - 1	GSUT - 1	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10
32	GSUT NGR - 2	GSUT - 2	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10
33	GSUT NGR - 3	GSUT - 3	1	10	1	35 kV CU (flat) 1 x 240 / 25	1 x (1 x 240 / 25)	10

BOQ	CABLE	TOTAL LENGTH (m)
	1 x 630 / 35	7200
	1 x 240 / 25	2613



CIRCUIT BREAKER
(withdrawable)

POWER TRANSFORMER
2 windings

EARTHING DISCONNECTOR

FUSE

CURRENT TRANSFORMER

VOLTAGE TRANSFORMER

CABLE/LINE TERMINAL

RESISTOR

GENERATOR
(driven by gas engine/turbine)

DIESEL GENERATOR

AUTOMATIC CHANGEOVER

INTERLOCK

RECTIFIER

INVERTER

BATTERY GROUP

NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

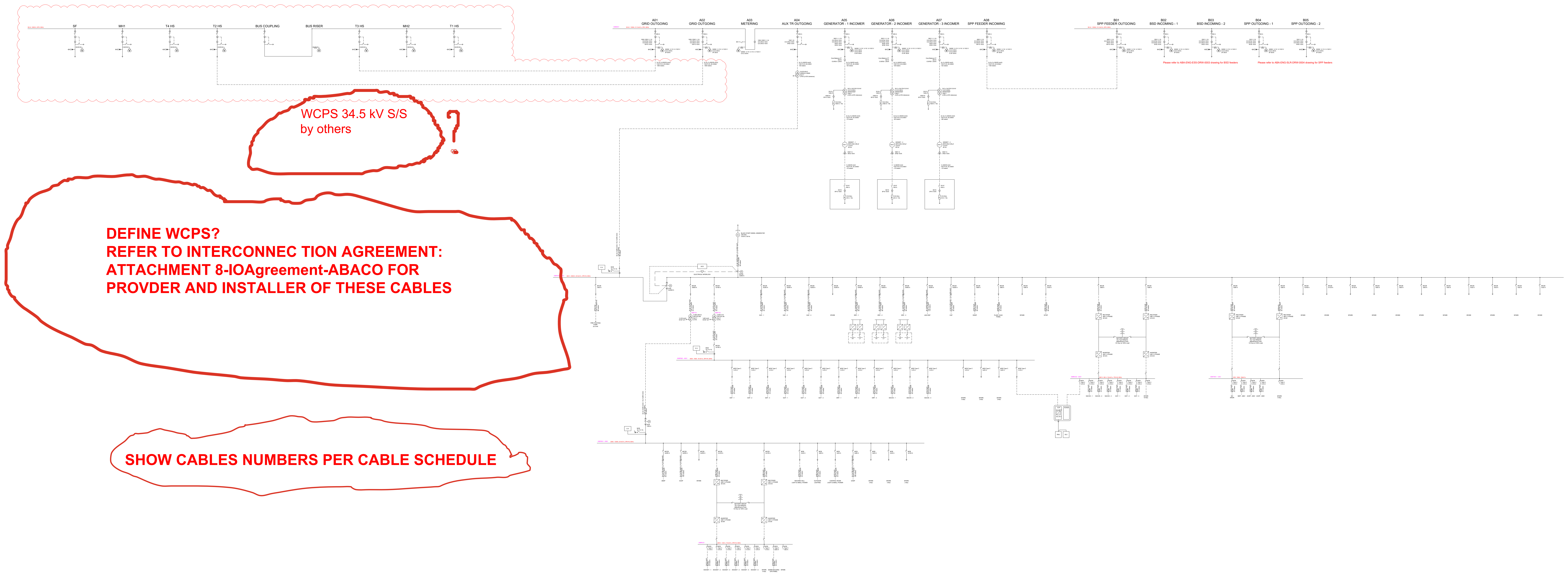
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

SIZE	SCALE
A1	–

DRAWING NUMBER:
ABA-ENG-ELC-SLD-0001

SHEET:
1
OF:
3

DRAWING NAME:
PLANT SINGLE LINE DRAWING
(MV/LV)


36 kV, 2500 A, 3PH, 60Hz
SF
MH1
T4 HS
T2 HS
BUS COUPLING
BUS RISER
T3 HS
MH2
T1 HS
00BBA01
36 kV, 1250A, 31.5 kA/1s, 3PH, 60Hz
A01
GRID OUTGOING
A02
GRID OUTGOING
A03
METERING
A04
AUX TR OUTGOING
A05
GENERATOR - 1 INCOMER
A06
GENERATOR - 2 INCOMER
A07
GENERATOR - 3 INCOMER
A08
SPP FEEDER INCOMING
3x 3x (1x 630/35 mm2)
YXC7V-R, 20.3/35kV
~400 meters
3x (1x 240/25 mm2)
YXC7V-R, 20.3/35kV
~45 meters
34.5/0.48 kV
2000kVA ONAN
Dyn11
Z=6% (±10% tolerance)
34.5 ± 2x2.5%/13.8 kV
12.5/14 MVA
ONAN/ONAF
YNd11
Z=8% (±10% tolerance)
19.9 Ohm
1000 A / 10s
36 kV, 1250A, 31.5 kA/1s, 3PH, 60Hz
B01
SPP FEEDER OUTGOING
B02
BSD INCOMING - 1
B03
BSD INCOMING - 2
B04
SPP OUTGOING - 1
B05
SPP OUTGOING - 2

Please refer to ABA-ENG-ESS-DRW-0003 drawing for BSD feeders

Please refer to ABA-ENG-SLR-DRW-0004 drawing for SPP feeders

WCPS 34.5 kV S/S
by others
?

DEFINE WCPS?
REFER TO INTERCONNEC TION AGREEMENT:
ATTACHMENT 8-IOAgreement-ABACO FOR
PROVDER AND INSTALLER OF THESE CABLES

SHOW CABLES NUMBERS PER CABLE SCHEDULE

GENERAL NOTES

COMPLIENCE

Mandatory Compliance and Precedence:

The Work (including all design, engineering, materials, fabrication, installation, testing, and documentation) shall be executed in full, complete, and unreserved compliance with all applicable stipulations contained within the following:

> Employer's Requirements: All specifications, performance criteria, schedules, and deliverables explicitly detailed in the Employer's Requirements, including all appendices, annexes, and subsequent approved addenda.
>
> Standards: The applicable editions of the relevant International Electrotechnical Commission (IEC) Standards and Institute of Electrical and Electronics Engineers (IEEE) Standards. This includes any national adoptions (e.g., ANSI, BSI, DIN, etc.) where required by law or specified in the Employer's Requirements.

Conflict Resolution:

It is mandatory that the work satisfy the reference documents. In the event of any conflict, discrepancy, ambiguity, or omission between the Employer's Requirements and the referenced IEC/IEEE or other standards, Employer's written decision will be followed.

NOTES

ABDP	Admin Building Distribution Panel
ACDP	Accomodotion Center Distribution Panel
CAP	Common Auxiliary Panel
CCP	Common Control Panel
EAP	Engine Auxiliary Panel
ERP	Engine Radiator Panel
GCP	Genset Control Panel
GHDP	Gate House Distribution Pnael
WSDP	Workhop Distribution Pnael

CLIENT

EA Energy

CONTRACTOR

iLTEKNO

DESIGNER

N22

SITE / PROJECT

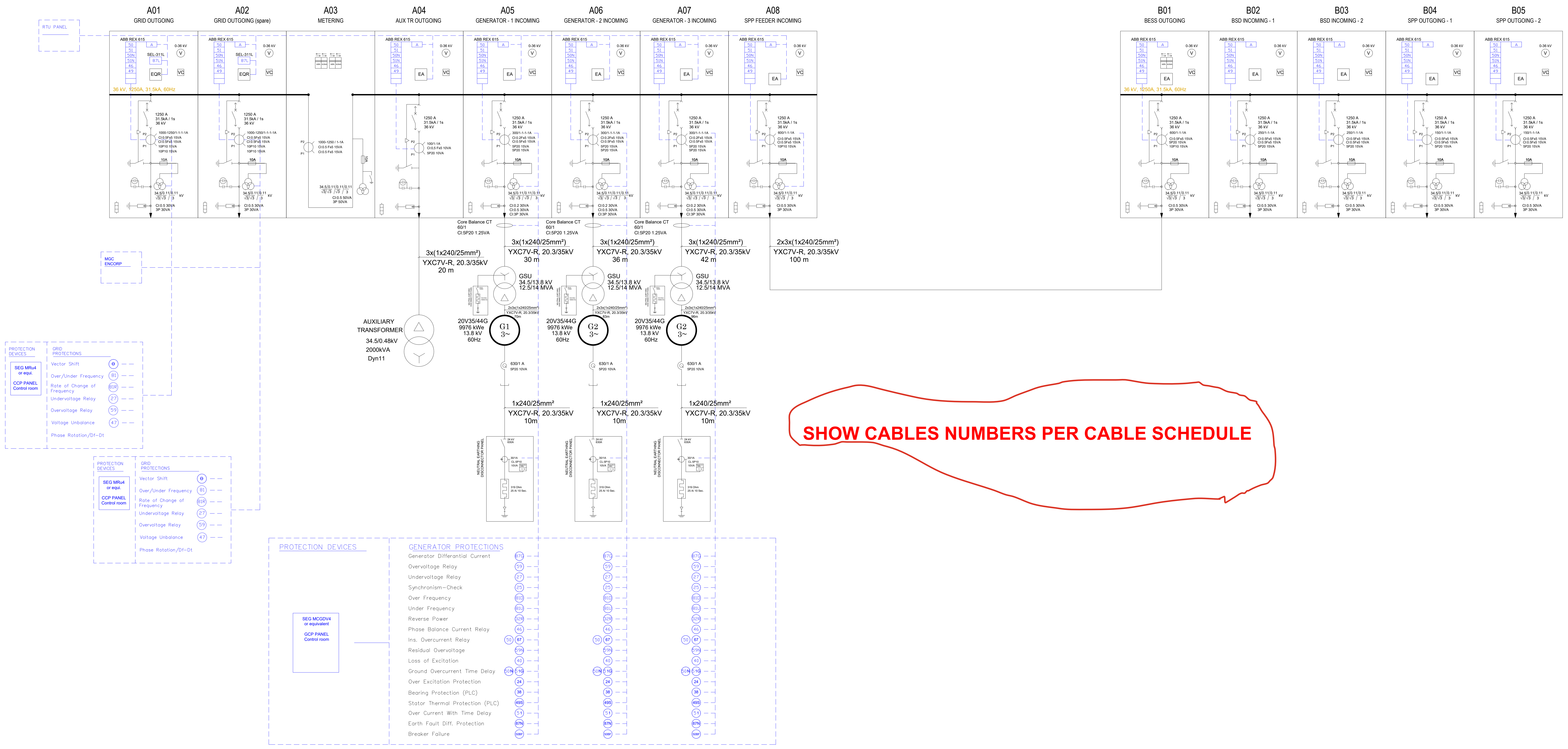
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

SIZE: 2A0
SCALE: –

DRAWING NUMBER: ABA-ENG-ELC-SLD-0001
SHEET: 2
OF: 3
DRAWING NAME: PLANT SINGLE LINE DRAWING (MV/LV)


RTU PANEL
MGC ENCORP
A01
GRID OUTGOING
A02
GRID OUTGOING (spare)
A03
METERING
A04
AUX TR OUTGOING
A05
GENERATOR - 1 INCOMING
A06
GENERATOR - 2 INCOMING
A07
GENERATOR - 3 INCOMING
A08
SPP FEEDER INCOMING
ABB REX 615
50
51
50N
51N
46
49
SEL-311L
87L
EQR
EA
VC
0-36 kV
36 kV, 1250A, 31.5kA, 60Hz
1250 A
31.5kA / 1s
36 kV
1000-1250/1-1-1-1A
Cl:0.5Fs5 15VA
10P10 15VA
1000-1250 / 1-1A
Cl:0.5 Fs5 15VA
100/1-1A
Cl:0,5 Fs5 10VA
5P20 10VA
300/1-1-1-1A
Cl:0.2Fs5 15VA
5P20 15VA
600/1-1-1A
10A
34.5/√3 / 0.11/√3 / 0.11/√3 / 0.11/3 kV
Cl:0.2 30VA
Cl:0.5 30VA
Cl:3P 30VA
Cl:0.5 50VA
3P 50VA
Core Balance CT
60/1
Cl:5P20 1.25VA
3x(1x240/25mm²)
YXC7V-R, 20.3/35kV
20 m
30 m
36 m
42 m
2x3x(1x240/25mm²)
YXC7V-R, 20.3/35kV
100 m
AUXILIARY TRANSFORMER
34.5/0.48kV
2000kVA
Dyn11
GSU
34.5/13.8 kV
12.5/14 MVA
2x3x(1x240/25mm²)
YXC7V-R, 20.3/35kV
70m
83m
96m
20V35/44G
9976 kWe
13.8 kV
60Hz
G1
G2
3~
630/1 A
5P20 10VA
1x240/25mm²
YXC7V-R, 20.3/35kV
10m
NEUTRAL EARTHING DISCONNECTOR PANEL
24 kV
630A
30/1A
CL:5P10
10VA
319 Ohm
25 A/ 10 Sec.
B01
BESS OUTGOING
B02
BSD INCOMING - 1
B03
BSD INCOMING - 2
B04
SPP OUTGOING - 1
B05
SPP OUTGOING - 2
250/1-1-1A
150/1-1-1A
PROTECTION DEVICES
SEG MRu4
or equi.
CCP PANEL
Control room
GRID PROTECTIONS
Vector Shift
Over/Under Frequency
Rate of Change of Frequency
Undervoltage Relay
Overvoltage Relay
Voltage Unbalance
Phase Rotation/Df-Dt
81
81R
27
59
47
PROTECTION DEVICES
SEG MCGDV4
or equivalent
GCP PANEL
Control room
GENERATOR PROTECTIONS
Generator Differantial Current
Overvoltage Relay
Undervoltage Relay
Synchronism-Check
Over Frequency
Under Frequency
Reverse Power
Phase Balance Current Relay
Ins. Overcurrent Relay
Residual Overvoltage
Loss of Excitation
Ground Overcurrent Time Delay
Over Excitation Protection
Bearing Protection (PLC)
Stator Thermal Protection (PLC)
Over Current With Time Delay
Earth Fault Diff. Protection
Breaker Failure
87G
59
27
25
81O
81U
32R
46
50
67
59N
40
50N
51G
24
38
49S
51
87N
50BF

SHOW CABLES NUMBERS PER CABLE SCHEDULE

GENERAL NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO

ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

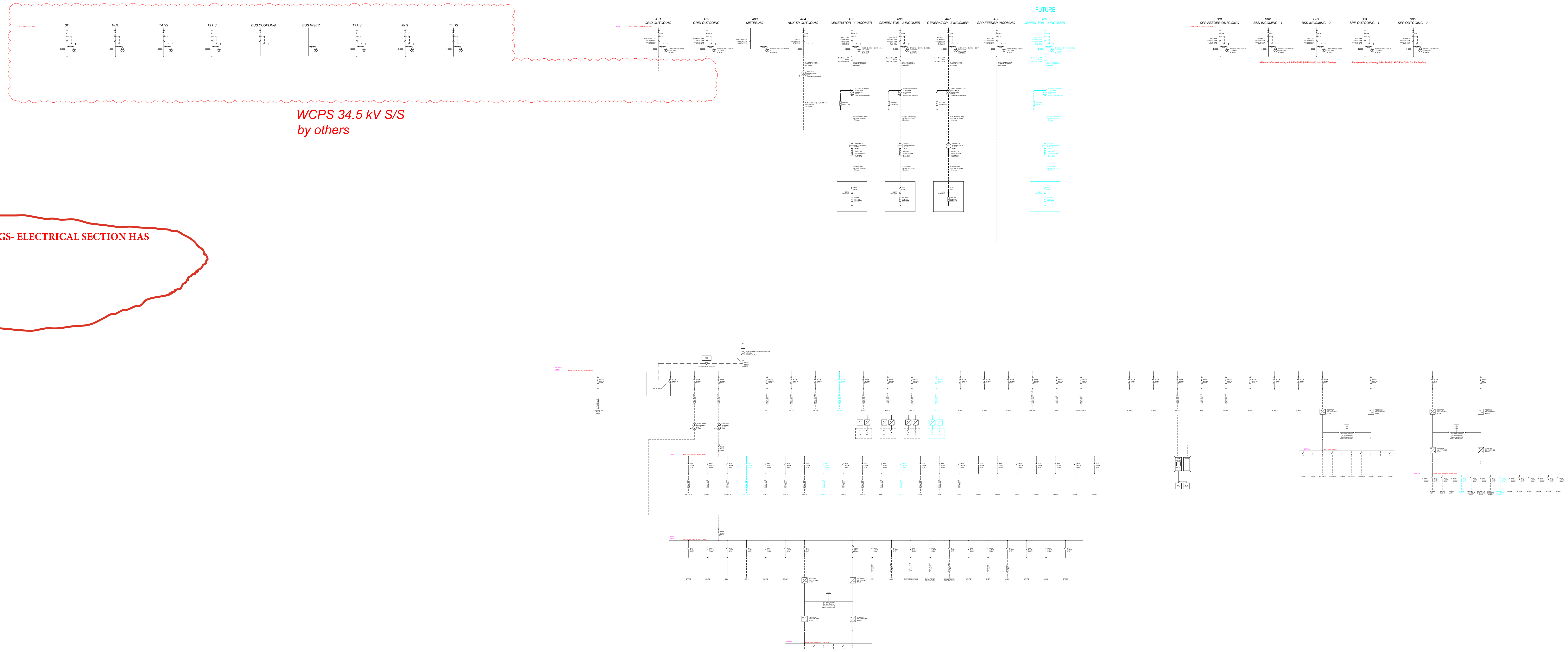
SIZE	SCALE
2A0	–

DRAWING NUMBER: ABA-ENG-ELC-SLD-0001

SHEET: 3 OF: 3

DRAWING NAME: PLANT SINGLE LINE DRAWING (MV/LV)

ATTACHMENT 12- DRAWINGS- ELECTRICAL SECTION HAS
SAME SLD REVISION 4:
ABA-ELC-SLD-0001 Rev.4


WCPS 34.5 kV S/S
by others
36 kV, 2500 A, 3PH, 60Hz
SF
MH1
T4 HS
T2 HS
BUS COUPLING
BUS RISER
T3 HS
MH2
T1 HS
00BBA
36 kV, 1250A, 31.5 kA/1s, 3PH, 60Hz
A01
GRID OUTGOING
A02
GRID OUTGOING
A03
METERING
A04
AUX TR OUTGOING
A05
GENERATOR - 1 INCOMER
A06
GENERATOR - 2 INCOMER
A07
GENERATOR - 3 INCOMER
A08
SPP FEEDER INCOMING
FUTURE
A09
GENERATOR - 4 INCOMER
34.5/0.48 kV
2000kVA ONAN
Dyn11
34.5 ± 2x2.5%/13.8 kV
12.5/14 MVA
ONAN/ONAF
YNd11
19.9 Ohm
1000 A / 10s
36 kV, 630A, 31.5 kA/1s, 3PH, 60Hz
B01
SPP FEEDER OUTGOING
B02
BSD INCOMING - 1
B03
BSD INCOMING - 2
B04
SPP OUTGOING - 1
B05
SPP OUTGOING - 2
630 A
34500/√3-110√3-110/3 V
Cl:0.5 30VA
3P 30VA
Please refer to drawing ABA-ENG-ESS-DRW-0003 for BSD feeders
Please refer to drawing ABA-ENG-SLR-DRW-0004 for PV feeders.

GENERAL NOTES

Feeders with CYAN is for future installation.

COMPLIENCE

Mandatory Compliance and Precedence:

The Work (including all design, engineering, materials, fabrication, installation, testing, and documentation) shall be executed in full, complete, and unreserved compliance with all applicable stipulations contained within the following:

Employer's Requirements: All specifications, performance criteria, schedules, and deliverables explicitly detailed in the Employer's Requirements, including all appendices, annexes, and subsequent approved addenda.

Standards: The applicable editions of the relevant International Electrotechnical Commission (IEC) Standards and Institute of Electrical and Electronics Engineers (IEEE) Standards. This includes any national adoptions (e.g., ANSI, BSI, DIN, etc.) where required by law or specified in the Employer's Requirements.

Conflict Resolution:

It is mandatory that the work satisfy the reference documents. In the event of any conflict, discrepancy, ambiguity, or omission between the Employer's Requirements and the referenced IEC/IEEE or other standards, Employer's written decision will be followed.

NOTES

CLIENT
E·A ENERGY

CONTRACTOR
iLTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER
N22

SITE / PROJECT
BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE	REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2A0	-	3	24.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
		2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
		1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
		0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER: ABA-ENG-ELC-SLD-0001
SHEET: 2
OF: 3
DRAWING NAME: PLANT SINGLE LINE DRAWING (MV/LV)

CLIENT

EA Energy

CONTRACTOR

iLTEKNO

DESIGNER

iLTEKNO

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

0	19.01.2026	ISSUED FOR REVIEW	S.K	S.S	T.S
REV	***DATE***	***DESCRIPTION***	***DONE***	***CHECKED***	***APPROVED***

STATUS

FOR INFORMATION ☐
FOR REVIEW ☒
FOR APPROVAL ☐
VALID FOR DESIGN ☐
VALID FOR PURCHASE PROCESS ☐
VALID FOR CONSTRUCTION ☐
AS BUILT ☐

ISSUE OWNER

iLTEKNO

SIGN	DATE

DOCUMENT NUMBER

ABA-ENG-GEN-PRO-002

DOCUMENT NAME

PRELIMINARY SAFETY PROTOCOLS AND EMERGENCY SHUTDOWN PROCEDURES

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1. PURPOSE

This document defines the Preliminary Safety Protocol and Emergency Shutdown Procedure for the Hybrid Power Plant including LNG Regasification Facilities developed for the Bahamas.

The purpose of this document is to describe, at a conceptual and preliminary level, the safety philosophy, emergency response principles, and emergency shutdown (“ESD”) logic applicable to the power generation and LNG regasification systems of the plant.

1.1 Objectives

The main objectives of this document are to:

- Present the overall safety approach adopted for the hybrid power plant and LNG regasification facilities
- Define the emergency shutdown philosophy and high-level shutdown sequences
- Identify key emergency scenarios and corresponding shutdown actions
- Demonstrate that the plant design incorporates recognized international safety principles

1.2 Scope of the Document

This document covers the following systems and interfaces, to the extent required for a preliminary safety assessment:

- LNG regasification and gas supply systems up to the gas engine inlet
- Gas-fired internal combustion engines (MAN gas engines) and associated auxiliary systems
- Electrical generation and power export systems relevant to emergency shutdown
- Integrated control and safety systems related to emergency shutdown functions
- Operator actions and responsibilities during emergency situations

Detailed engineering design and final operating procedures are outside the scope of this document and will be developed in later project phases.

2. INTRODUCTION

EMPLOYER:	E.A ENERGY
CONTRACTOR:	ILTEKNO
PROJECT:	ABACO & ELUETHERA HYBRID POWER PLANT

Abaco Hybrid Power Plant will be located on Abaco Island belonging to Commonwealth of the Bahamas.

The Hybrid Power Plant shall consist of 3 (three) gas engine generators. The gas engines selected will be a MAN 20V35/44G. The method of cooling the engine will be by dual circuit (High & Low Temperature) Dry Cooler.

Natural Gas for the Hybrid Power Plant will be supplied to the terminal point from the LNG Regasification Plant which is going to be constructed next to the Hybrid Power Plant. No standby fuel for the gas engines will be required

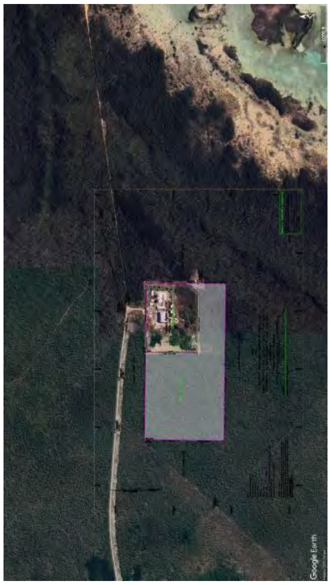
2.1 Site Location

The general project data and site condition are explicitly noted in the following documents.

The Site is located on the Island of Abaco immediately West of Wilson City Power Plant and approximately 4.8 miles Southeast of Great Abaco Highway. The total area of the Site is approximately 60 acres (24 ha).

The Site is located approximately at this location:

Latitude: 26.361859°
Longitude: -77.045710°



Location of the Site (Abaco Island)

3. SAFETY PHILOSOPHY AND DESIGN PRINCIPLES

The safety approach for the hybrid power plant and LNG regasification facility is based on the principle that hazardous situations shall be identified, controlled, and mitigated through proven engineering practices and basic automated safety functions.

This document describes the preliminary safety intent only and does not define detailed risk reduction targets or final safety integrity requirements.

3.1 General Safety Approach

The plant safety concept is based on:

- Safe and controlled handling of LNG and natural gas
- Prevention of uncontrolled gas release
- Automatic shutdown of affected systems during abnormal conditions
- Protection of personnel and critical equipment

The safety approach follows standard industry practice for modular LNG regasification and gas engine power plants.

3.2 Design Basis

The LNG regasification system is based on a modular, skid-mounted design, supplied as a complete package by the LNG system vendor.

The hybrid power plant consists of a gas-fired power generation block supplied by natural gas from an on-site LNG storage and regasification facility.

The power generation system consists of industrial gas engines designed for continuous operation on natural gas, including associated auxiliary systems such as lubrication, cooling, and control systems.

The LNG regasification system and gas engines are designed as functionally separate systems with a defined gas supply interface.

3.3 Gas Engine Safety Concept

The gas engines are equipped with OEM-standard protection and safety functions, including:

- Engine protection systems for speed, temperature, and pressure
- Automatic shutdown of the engine in case of abnormal operating conditions
- Isolation of gas supply to the engine upon emergency shutdown
- Local and remote emergency stop capability

The gas engine safety functions are integrated into the engine control system and operate independently from the LNG regasification control system.

3.4 Emergency Shutdown Interaction Between LNG and Gas Engines

In the event of an emergency shutdown affecting the LNG regasification system:

- Gas supply to the power generation system is automatically isolated
- Gas engines are shut down in a controlled manner via their respective control systems
- Electrical load is disconnected as required

Conversely, an emergency shutdown initiated at the gas engine level does not directly affect LNG storage, unless required by gas supply isolation logic.

3.5 Control and Automation Philosophy

The LNG regasification facility is controlled by a standalone PLC system, while the gas engines are controlled by their respective OEM engine control systems over main plant control SCADA.

Interfaces between the two systems are limited to:

- Gas availability signals
- Emergency shutdown signals
- Status and alarm indication

3.6 Operator Interaction and Safety

Operators can initiate emergency shutdown actions via:

- Emergency stop push buttons located at the LNG facility
- Emergency stop devices located at the power generation area
- Control room interfaces

Emergency shutdown actions are designed to be simple and intuitive, without requiring complex operator decision-making during emergency situations.

3.7 Scope Limitations and Responsibilities

This section describes the preliminary safety concepts applicable to the LNG regasification and gas engine systems.

Detailed engine protection logic, LNG process control logic, and emergency response procedures are governed by:

- OEM documentation for the gas engines
- LNG system supplier documentation
- Final operating procedures to be developed during later project phases

4. HAZARD IDENTIFICATION SUMMARY (PRELIMINARY)

This section provides a high-level and non-exhaustive identification of potential hazards associated with the hybrid power plant and LNG regasification facility.

The purpose of this section is to demonstrate that key safety-relevant hazards have been considered at a preliminary level and that appropriate emergency shutdown and control concepts are envisaged.

4.1 General Approach

Hazards have been identified based on:

- The overall plant configuration
- The LNG regasification process
- The gas-fired power generation system
- Interfaces between major plant areas

Reference is made to the Gas Works Plant Layout for general arrangement and area segregation (ABA-ENG-GEN-LYT-0002-REV.4-GAS WORKS PLANT LAYOUT).

4.2 LNG Regasification Facility – Identified Hazards

Potential hazards associated with the LNG regasification facility include:

- Release of LNG during unloading, storage, or transfer
- Release of natural gas during vaporization or pressure regulation
- Cryogenic exposure due to LNG leakage
- Overpressure of LNG or gas systems
- Fire or gas dispersion within the LNG facility area

The LNG storage tanks, vaporizers, and associated equipment are located within a dedicated regasification area, physically separated from the power generation facilities as indicated on the plant layout

4.3 Gas Supply and Interface Hazards

Potential hazards at the interface between the LNG facility and the gas engines include:

- Loss of gas containment in gas piping

- Abnormal gas pressure or flow conditions
- Uncontrolled gas supply to the power generation system

These hazards are addressed through defined gas isolation points and emergency shutdown functions at the interface between the LNG regasification system and the power plant.

4.4 Gas Engine Area – Identified Hazards

Potential hazards associated with gas engine operation include:

- Gas leaks within the engine hall or associated piping
- Abnormal engine operating conditions (temperature, pressure, speed)
- Mechanical failures during operation
- Fire risks related to fuel gas or hot surfaces

The gas engines are installed within a dedicated machine hall, separate from the LNG regasification area, as shown on the plant layout

4.5 Electrical and Hybrid Plant Hazards

Potential hazards associated with electrical systems and hybrid plant operation include:

- Electrical faults or short circuits
- Loss of power to auxiliary systems
- Interaction between power generation, battery energy storage system (BESS), and grid connection

Electrical equipment and energy storage systems are arranged in designated areas to limit interaction with gas and LNG-related systems

4.6 Emergency Scenarios Considered

The following emergency scenarios are considered at a preliminary level:

- Gas detection within LNG or gas engine areas
- Fire detection within process or equipment areas
- Major equipment malfunction requiring immediate shutdown
- Manual activation of emergency stop devices

In such scenarios, emergency shutdown actions are intended to isolate gas supply and shut down affected systems.

5. SAFETY SYSTEMS OVERVIEW

This section provides a high-level overview of the main safety systems implemented in the hybrid power plant and LNG regasification facility.

The safety systems described herein are intended to support early detection of abnormal conditions, emergency shutdown, and fire protection, in accordance with applicable standards and project requirements.

Detailed system design and sizing are addressed in separate discipline-specific documents.

5.1 Fire Detection System

A fire detection and alarm system is provided throughout the plant to detect fire-related events at an early stage.

The fire detection system includes, as applicable:

- Smoke detectors
- Heat detectors
- Flame detectors (where required)
- Manual call points
- Audible and visual alarm devices

The fire detection system is designed in accordance with NFPA 72 and applicable project standards.

Fire detection coverage and zoning are defined based on plant layout and area classification, as described in the Fire Protection Risk Assessment Study (ABA-ENG-MEC-RAS-0001-REV.1-Fire Protection Risk Assessment Study)

5.2 Fire Fighting and Fire Suppression Systems

The plant is provided with a general fire fighting and fire suppression system designed in accordance with relevant NFPA standards.

Fire protection measures include, as applicable:

- Fire water system with hydrants and hose reels
- Portable fire extinguishers
- Fixed fire suppression systems in selected areas
- Passive fire protection measures where required

The overall fire protection concept, system selection, and area coverage are described in the Fire Protection Risk Assessment Study and its annexes

5.3 Gas Detection System

Gas detection systems are provided in LNG regasification areas and gas engine-related spaces where natural gas may be present.

The gas detection system is intended to:

- Detect the presence of natural gas at an early stage
- Generate alarms for operator awareness
- Initiate emergency shutdown actions where applicable

The gas detection philosophy and alarm setpoints are defined by the LNG system supplier and the gas engine OEM, in accordance with applicable standards.

5.4 Emergency Shutdown (ESD)

Emergency shutdown (ESD) of the plant is implemented as a functional capability within the plant control and monitoring system, and not as a separate or independent hardware safety system.

Emergency shutdown actions are initiated through the SCADA and associated control systems, based on predefined conditions or manual operator input.

The emergency shutdown function is intended to:

- Stop LNG transfer and regasification operations
- Isolate natural gas supply to the power generation system
- Shut down affected equipment in a controlled manner
- Support safe conditions during abnormal or emergency situations

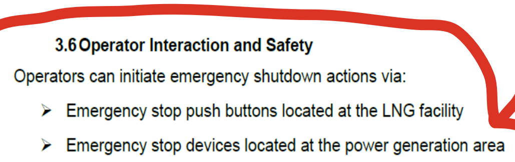
Emergency shutdown may be initiated by:

- Fire or gas detection signals
- Abnormal process or equipment conditions
- Manual activation by operators via emergency stop push buttons
- Operator command from the control room

add reference

The detailed shutdown logic, signal handling, and sequence of actions are defined within the control system configuration and will be finalized during the detailed engineering phase.

The emergency shutdown philosophy and general principles are described in Section 6 of this document.



3.6 Operator Interaction and Safety

Operators can initiate emergency shutdown actions via:

- Emergency stop push buttons located at the LNG facility
- Emergency stop devices located at the power generation area

6. EMERGENCY SHUTDOWN PHILOSOPHY

This section describes the emergency shutdown philosophy applicable to the hybrid power plant and LNG regasification facility.

Emergency shutdown is implemented as a functional capability within the plant control and monitoring systems, intended to bring affected parts of the plant to a safe condition during abnormal or emergency situations.

6.1 Definition of Emergency Shutdown

Emergency shutdown (ESD) refers to a controlled and rapid shutdown action initiated to mitigate unsafe conditions and prevent escalation.

Emergency shutdown is distinct from normal operational shutdowns and is initiated when immediate action is required to protect:

- Personnel
- Equipment
- The facility as a whole

6.2 Emergency Shutdown Initiation

Emergency shutdown actions **may be initiated** through the plant SCADA and control systems based on:

- Signals from fire detection systems
- Signals from gas detection systems
- Abnormal operating conditions detected by control systems
- Manual activation by operators via emergency stop push buttons
- Operator command from the control room

Emergency shutdown initiation does not rely on a standalone safety system and is handled within the plant's control and automation architecture.

6.3 Emergency Shutdown Philosophy

The emergency shutdown philosophy is based on the following principles:

- Emergency shutdown actions are automatic or manual, depending on the initiating event
- Shutdown actions are limited to the affected systems or areas, where practicable
- Gas supply is isolated as part of emergency shutdown actions

- Equipment is shut down in a controlled manner to avoid secondary hazards
- Operator intervention during emergency conditions is minimize

6.4 Shutdown Scope and Hierarchy

Emergency shutdown actions may be applied at different levels, depending on the nature and location of the event:

- Local equipment shutdown
- Area-based shutdown
- Plant-wide shutdown, where required

The selection of shutdown scope is determined by the control system logic and operator actions.

6.5 Interaction Between LNG Facility and Gas Engines

In the event of an emergency shutdown related to the LNG regasification facility:

- LNG transfer and regasification operations are stopped
- Natural gas supply to the power plant is isolated
- Gas engines are shut down via their respective control systems

An emergency shutdown initiated at the gas engine level may result in isolation of gas supply without directly affecting LNG storage, unless required by control logic.

6.6 Operator Role During Emergency Shutdown

Operators are supported by the control system during emergency shutdown events.

Operator responsibilities include:

- Acknowledging alarms
- Initiating manual emergency shutdown if required
- Following established emergency procedures after shutdown

Emergency shutdown actions are designed to be clear, simple, and unambiguous.

6.7 Reset and Restart Philosophy

After an emergency shutdown event:

- The cause of the shutdown must be identified
- Acknowledgement and reset are required via the control system

- Restart is permitted only after confirmation that the unsafe condition has been cleared

Detailed restart procedures are defined in operating manuals and are outside the scope of this document.

6.8 Limitations

This section describes the preliminary emergency shutdown philosophy only.

The following items are outside the scope of this document:

- Detailed shutdown logic
- Control system programming details
- Final operating and emergency response procedures

7. EMERGENCY SHUTDOWN LEVELS AND ACTIONS

This section describes the emergency shutdown levels and corresponding actions applicable to the hybrid power plant, considering both the gas engine power generation systems and the LNG regasification facility.

The shutdown levels described below are conceptual and plant-specific, and are intended to illustrate the general response philosophy rather than define detailed control logic.

7.1.1 General Shutdown Level Concept

Emergency shutdown actions are applied based on:

- The type of event (gas detection, fire detection, equipment malfunction)
- The location of the event
- The potential impact on adjacent systems

Shutdown actions are designed to be proportional to the event, avoiding unnecessary plant-wide shutdown where possible.

7.2 Local Shutdown – Equipment or Area Specific

Local emergency shutdown actions are intended to address events limited to a specific piece of equipment or a defined area.

Typical triggers may include:

- Gas detection within a localized LNG or gas engine area
- Fire detection limited to a specific room or equipment zone
- Abnormal operating conditions of individual equipment

Typical actions may include:

- Shutdown of the affected equipment
- Isolation of local gas supply
- Alarm indication to the control room
- Continued operation of unaffected plant areas, where safe

7.3 Area-Based Shutdown – Gasification or Power Generation Area

Area-based emergency shutdown actions are applied when an event affects a larger functional area of the plant.

7.3.1 LNG Regasification Area

For events detected within the LNG regasification area, such as:

- Gas detection above predefined thresholds
- Fire detection within the LNG facility

Typical shutdown actions may include:

- Stopping LNG transfer and regasification processes
- Isolation of LNG and natural gas lines within the LNG facility
- Blocking gas supply to the power generation system
- Alarm and indication to operators

7.3.2 Gas Engine and Power Generation Area

For events detected within the gas engine or power generation area, such as:

- Gas detection within the engine hall
- Fire detection near gas engines or auxiliary systems

Typical shutdown actions may include:

- Shutdown of affected gas engines
- Isolation of gas supply to the affected engines
- Disconnection of electrical load as required
- Alarm and indication to operators

7.4 Plant-Wide Emergency Shutdown

Plant-wide emergency shutdown actions may be initiated when:

- Events cannot be contained within a single area
- Multiple detection signals are received
- Manual emergency shutdown is initiated by operators or authorized personnel

Typical plant-wide actions may include:

- Shutdown of all gas engines
- Isolation of gas supply from the LNG regasification facility
- Shutdown of LNG regasification operations
- Transition of the plant to a safe, non-operating condition

7.5 Gas and Fire Detection Interaction

Gas and fire detection systems play a key role in determining the appropriate shutdown level.

- Gas detection is primarily used to trigger gas isolation and equipment shutdown
- Fire detection may trigger equipment shutdown, gas isolation, and fire protection actions
- Detection signals are processed by the control system to determine the appropriate shutdown response

Shutdown actions are initiated automatically or manually depending on the nature of the event and control system configuration.

7.6 Manual Emergency Shutdown

Manual emergency shutdown can be initiated at any time by operators via:

- Emergency stop push buttons
- Control room operator commands

Manual emergency shutdown overrides normal operation and initiates predefined shutdown actions appropriate to the plant condition.

7.7 Flexibility of Shutdown Levels

The shutdown levels and actions described in this section are indicative and may be adjusted during detailed engineering to reflect:

- Final plant configuration
- Vendor system design

- Regulatory or operational requirements

8. EMERGENCY SHUTDOWN TRIGGERS

Emergency shutdown actions within the hybrid power plant may be initiated when operating conditions indicate a potential risk to personnel safety, equipment integrity, or safe operation of the facility.

Triggers for emergency shutdown are derived from process monitoring, fire and gas detection, and operator intervention, and are processed through the plant control and monitoring systems.

Detection of natural gas within areas where gas is not normally present, or detection of gas concentrations exceeding predefined alarm thresholds, may initiate emergency shutdown actions. Such actions are intended to isolate gas supply, stop affected processes, and prevent escalation of the event.

Fire detection within LNG regasification areas, gas engine areas, or other safety-critical zones may also trigger emergency shutdown actions. Depending on the location and extent of the detected event, shutdown actions may be limited to the affected area or extended to a wider portion of the plant.

Abnormal operating conditions identified by the control systems, such as deviations in pressure, temperature, flow, or equipment operating status, may result in emergency shutdown where continued operation is considered unsafe. These conditions are evaluated by the control system logic and acted upon accordingly.

Emergency shutdown may also be initiated manually by operators when an unsafe condition is observed, or when there is uncertainty regarding the safe continuation of operation. Manual emergency shutdown capability is provided to allow rapid response independent of automatic detection systems.

In all cases, emergency shutdown triggers are intended to support a timely and controlled transition to a safe condition, without reliance on complex operator decision-making during emergency situations.

The specific trigger thresholds, logic, and response actions are defined within the control system configuration and will be finalized during the detailed engineering phase.

9. POST-SHUTDOWN SAFETY MEASURES

Following an emergency shutdown event, the plant is expected to remain in a safe and stable condition while further actions are assessed and coordinated by operations personnel.

Post-shutdown conditions are managed primarily through the plant control and monitoring systems, which continue to provide visibility of key parameters and alarm status after shutdown.

Where applicable, gas supply remains isolated and affected equipment remains stopped until confirmation is obtained that the initiating condition has been resolved. Systems required for equipment protection, such as cooling or auxiliary services, may continue to operate as needed to prevent secondary damage.

Ventilation of affected areas may be maintained or initiated to reduce the presence of gas or smoke following a shutdown event. Access to impacted areas is restricted until conditions are confirmed to be safe.

Post-shutdown actions are focused on stabilization rather than immediate restart. Any inspection, intervention, or reset activity is performed only after the situation has been assessed and deemed safe by authorized personnel.

Detailed post-shutdown checks and recovery steps are addressed in operating and maintenance procedures and are outside the scope of this document.

10. OPERATOR ACTIONS DURING EMERGENCY

During emergency situations, operators are supported by the plant control and monitoring systems, which provide alarms, indications, and system status information.

Operators are expected to respond by acknowledging alarms, monitoring plant conditions, and initiating manual emergency shutdown actions where automatic response is not sufficient or where additional precautionary action is required.

The emergency shutdown philosophy is designed to minimize reliance on complex operator decision-making during critical events. Operators are not expected to manage detailed shutdown sequences during emergencies, as shutdown actions are executed automatically by the control system once triggered.

Communication and coordination between control room personnel and site staff form an important part of emergency response. Operators may restrict access to affected areas and communicate plant status to relevant internal or external parties as required.

Following stabilization of the plant, operators support post-shutdown assessment activities and participate in the controlled return to operation, subject to applicable procedures and authorization.

Training, drills, and detailed emergency response instructions are addressed in separate documentation and are not covered within this preliminary safety protocol.

11. RESTART PHILOSOPHY AFTER EMERGENCY SHUTDOWN

Restart of the plant following an emergency shutdown is performed in a controlled and deliberate manner and only after the conditions that led to the shutdown have been identified and resolved.

An emergency shutdown event requires acknowledgement and reset through the plant control and monitoring systems before any restart attempt can be made. Restart is not automatic and requires operator confirmation.

Prior to restart, relevant plant conditions are reviewed to confirm that the affected systems are in a safe and stable state. This may include verification that gas supply has been properly isolated and that no active fire or gas alarms remain.

The restart process may be performed in stages, depending on the scope of the emergency shutdown and the systems affected. LNG regasification systems and gas engines may be restarted independently where appropriate, subject to control system logic and operational authorization.

Detailed restart procedures, checks, and sequencing are defined in operating manuals and OEM documentation and are outside the scope of this document.

12. REFERENCES

The following documents are referenced for information purposes in the preparation of this Preliminary Safety Protocol and Emergency Shutdown Procedure.

Project and Plant Documents

- ABA-ENG-GEN-LYT-0001 – Project Layout
- ABA-ENG-GEN-LYT-0002 – Gas Works Plant Layout
- ABA-ENG-MEC-SPE-0001 – Mechanical Design Criteria

Fire Protection and Safety Documents

- ABA-ENG-MEC-RAS-0001 – Fire Protection Risk Assessment Study
- ABA-ENG-MEC-RAS-0001 – Annex I – Fire Risk Evaluation Report Record Table

LNG Regasification and Gas Supply

- LNG Regasification System – Supplier Proposal

Gas Engine OEM

- MAN Energy Solutions – Industrial Gas Engine Documentation

ASTOR®

Transformer Technical Data Sheet

Date : 29.12.2025
Tender No : 25/4276
Rev. No :

Project Name : **ELEUTHERA PROJECT**

Order Code :

SHOULD BE REMOVED FROM TRANSFORMER LIST

General Characteristics

1.	Type of Product		:	Hermetically Sealed	
2.	Tank Type		:	Corrugated walls	
3.	Applied Standard/s		:	IEC 60076	
4.	Rated Power		:	1600	kVA
5.	No-Load Rated Voltages	(HV/LV)	:	34,5 / 0,48	kV
6.	Voltage Tapping	(@ HV)	: taps: 5	34,5 kV (-2,+2) x 2,5 %	Off-load
7.	Vector Group		:	Dyn 11	
8.	Conductor Material	(HV/LV)	:	Aluminium / Aluminium	
9.	Frequency		:	60	Hz
10.	Number of Phase		:	3	phase
11.	Maximum Ambient Temperature		:	-25 / 40	°C
12.	Winding / Oil Temprature Rise Limits		:	65 / 60	K
13.	Cooling method		:	ONAN	
14.	Operation duty		:	Continuous	
15.	Altitude		:	≤ 1000	m
16.	Oil details	Mineral	:	Shell Diala S4 ZX-I or Equiv.	
17.	Surface Protection & Outer Colour	Acc. to ISO 12944-5	:	C4-H & RAL 7033	

Test Voltage Levels

* Acc. to IEC 60076-3

		Um (kV)	Full Wave Lightning Impulse Withstand LI (kV)	Applied Voltage AC Withstand AV (kV)
18.	HV side	≤ 36	170	70
19.	LV side	≤ 1,1	---	3

Bushing Types & Terminations

		Standard & Type		Placement & Protection Class	
20.	HV side	DIN	Porcelain	On the cover	with cable box
21.	LV side	DIN	Porcelain	On the cover	with cable box

Guaranteed Values

22.	No-Load Losses		(Po)	:	2200	Watt
23.	Load Losses	@ 75 °C & Nom. Pos.	(Pk)	:	14500	Watt
24.	Short Circuit Impedance	@ 75 °C & Nom. Pos.	(Uk)	:	6	%
25.	Noise Level (Sound Power)		(L_{WA})	:	69	dB (A)
26.	Short Circuit withstand Dur		(t_{sc})	:	2	s

* Note : Tolerances will be applied on guaranteed values accordinto IEC 60076.

Outer Dimensions

		Total	@ Transporting	
27.	Length	1840	1840	mm
28.	Width	1270	1270	mm
29.	Height	2230	2230	mm
30.	Roller Space	820	--	mm

Weights

31.	Oil	:	665	kg
32.	Active Part	:	1865	kg
33.	Total	:	3450	kg
34.	Transport mass of tank	:	3450	kg

* Note : All dimensions and weigths are specified as approximately. Actual product may differ from above calculated values.

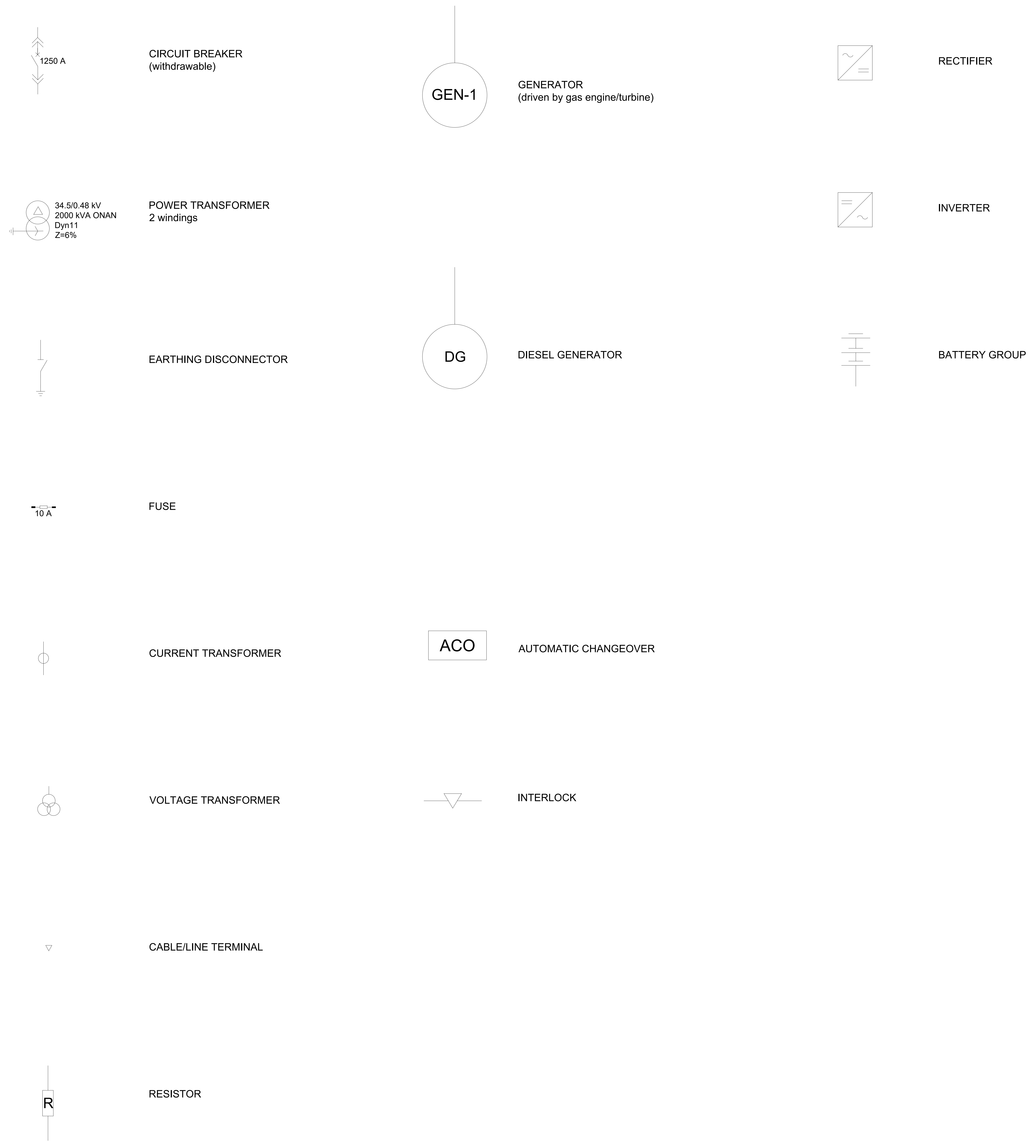
Accessories

- Off-Load Tap Changer (1 pc.)
- Hermetically protection relay (DMCR) (1 pc.)
- Pressure Relief Device (1 pc.)
- Terminal box
- Two way adjustable wheels (4 pcs.)

Additional Information

Prepared by İ.ÇELİK

Approved by H.ÜNLÜER



CIRCUIT BREAKER
(withdrawable)

POWER TRANSFORMER
2 windings

EARTHING DISCONNECTOR

FUSE

CURRENT TRANSFORMER

VOLTAGE TRANSFORMER

CABLE/LINE TERMINAL

RESISTOR

GENERATOR
(driven by gas engine/turbine)

DIESEL GENERATOR

AUTOMATIC CHANGEOVER

INTERLOCK

RECTIFIER

INVERTER

BATTERY GROUP

NOTES

CLIENT

EA Energy

CONTRACTOR

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ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

n22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

SIZE	SCALE
A1	–

DRAWING NUMBER: ABA-ENG-ELC-SLD-0001

SHEET: 1
OF: 3

DRAWING NAME:
PLANT SINGLE LINE DRAWING
(MV/LV)

36 kV, 2500 A, 3PH, 60Hz
SF
MH1
T4 HS
T2 HS
BUS COUPLING
BUS RISER
T3 HS
MH2
T1 HS
36 kV, 1250A, 31.5 kA/1s, 3PH, 60Hz
A01
GRID OUTGOING
A02
GRID OUTGOING
A03
METERING
A04
AUX TR OUTGOING
A05
GENERATOR - 1 INCOMER
A06
GENERATOR - 2 INCOMER
A07
GENERATOR - 3 INCOMER
A08
SPP FEEDER INCOMING
B01
SPP FEEDER OUTGOING
B02
BSD INCOMING - 1
B03
BSD INCOMING - 2
B04
SPP OUTGOING - 1
B05
SPP OUTGOING - 2
Please refer to ABA-ENG-ESS-DRW-0003 drawing for BSD feeders
Please refer to ABA-ENG-SLR-DRW-0004 drawing for SPP feeders
34.5/0.48 kV
2000kVA ONAN
Dyn11
Z=6% (±10% tolerance)
34.5 ± 2x2.5%/13.8 kV
12.5/14 MVA
ONAN/ONAF
YNd11
Z=8% (±10% tolerance)
GENSET - 1
9976 kWe 0.80 pf
13.8 kV
60 Hz
GENSET - 2
9976 kWe 0.80 pf
13.8 kV
60 Hz
GENSET - 3
9976 kWe 0.80 pf
13.8 kV
60 Hz
319 Ohm
25 A / 10s
BLACK START DIESEL GENERATOR
400 kWe
0.48 kV, 60 Hz
MCCB
3x800 A

WCPS 34.5 kV S/S
by others

Rating is inconsistent with ABA-ENG-ELC-SLD-0001

Specs do not match with Global_Bahamas_Technical Specification & Schedules_R00.docx. i.e. % impedance value

Does not match with specs in 3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx

3.3.6 of Global_Bahamas_Technical Specification & Schedules_R00.docx states that voltage is 400 /230 VAC

Add proper labeling of panels. Show how Admin and Machine hall panels labels too

GENERAL NOTES

COMPLIENCE

Mandatory Compliance and Precedence:

The Work (including all design, engineering, materials, fabrication, installation, testing, and documentation) shall be executed in full, complete, and unreserved compliance with all applicable stipulations contained within the following:

> Employer’s Requirements: All specifications, performance criteria, schedules, and deliverables explicitly detailed in the Employer’s Requirements, including all appendices, annexes, and subsequent approved addenda.
>
> Standards: The applicable editions of the relevant International Electrotechnical Commission (IEC) Standards and Institute of Electrical and Electronics Engineers (IEEE) Standards. This includes any national adoptions (e.g., ANSI, BSI, DIN, etc.) where required by law or specified in the Employer’s Requirements.

Conflict Resolution:

It is mandatory that the work satisfy the reference documents. In the event of any conflict, discrepancy, ambiguity, or omission between the Employer’s Requirements and the referenced IEC/IEEE or other standards, Employer's written decision will be followed.

NOTES

ABDP	Admin Building Distribution Panel
ACDP	Accomodotion Center Distribution Panel
CAP	Common Auxiliary Panel
CCP	Common Control Panel
EAP	Engine Auxiliary Panel
ERP	Engine Radiator Panel
GCP	Genset Control Panel
GHDP	Gate House Distribution Pnael
WSDP	Workhop Distribution Pnael

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DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

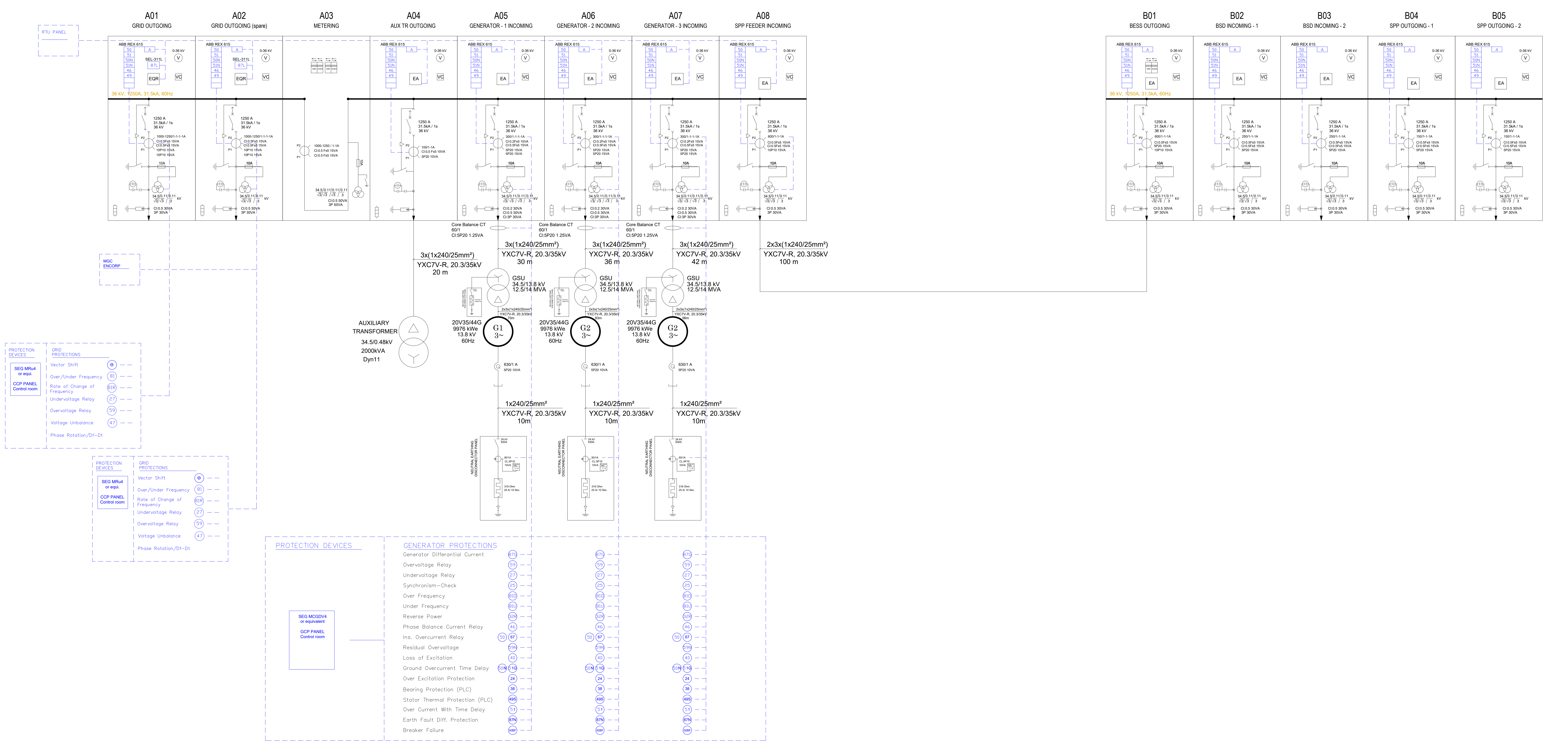
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

SIZE	SCALE
2A0	–

DRAWING NUMBER: ABA-ENG-ELC-SLD-0001

SHEET: 2 OF: 3

DRAWING NAME: PLANT SINGLE LINE DRAWING (MV/LV)


RTU PANEL
MGC ENCORP
A01
GRID OUTGOING
A02
GRID OUTGOING (spare)
A03
METERING
A04
AUX TR OUTGOING
A05
GENERATOR - 1 INCOMING
A06
GENERATOR - 2 INCOMING
A07
GENERATOR - 3 INCOMING
A08
SPP FEEDER INCOMING
B01
BESS OUTGOING
B02
BSD INCOMING - 1
B03
BSD INCOMING - 2
B04
SPP OUTGOING - 1
B05
SPP OUTGOING - 2
ABB REX 615
50
51
50N
51N
46
49
A
SEL-311L
87L
EQR
EA
VC
0-36 kV
V
kWh
kVArh
36 kV, 1250A, 31.5kA, 60Hz
1250 A
31.5kA / 1s
36 kV
1000-1250/1-1-1-1A
Cl:0.5Fs5 15VA
10P10 15VA
1000-1250 / 1-1A
Cl:0.5 Fs5 15VA
100/1-1A
Cl:0,5 Fs5 10VA
5P20 10VA
300/1-1-1-1A
Cl:0.2Fs5 15VA
5P20 15VA
600/1-1-1A
250/1-1-1A
150/1-1-1A
10A
34.5/√3 / 0.11/√3 / 0.11/√3 / 0.11/3 kV
Cl:0.5 50VA
3P 50VA
Cl:0.2 30VA
Cl:0.5 30VA
Cl:3P 30VA
P1
P2
Core Balance CT
60/1
Cl:5P20 1.25VA
3x(1x240/25mm²)
YXC7V-R, 20.3/35kV
20 m
30 m
36 m
42 m
2x3x(1x240/25mm²)
100 m
AUXILIARY TRANSFORMER
34.5/0.48kV
2000kVA
Dyn11
GSU
34.5/13.8 kV
12.5/14 MVA
NEUTRAL EARTHING DISCONNECTOR PANEL
24 kV 1250A
19.9 Ohm 1000A/10s
2x3x(1x240/25mm²)
70m
83m
96m
20V35/44G
9976 kWe
13.8 kV
60Hz
G1 3~
G2 3~
630/1 A
5P20 10VA
1x240/25mm²
10m
319 Ohm
25 A/ 10 Sec.
PROTECTION DEVICES
SEG MRu4
or equi.
CCP PANEL
Control room
GRID PROTECTIONS
Vector Shift ϴ
Over/Under Frequency 81
Rate of Change of Frequency 81R
Undervoltage Relay 27
Overvoltage Relay 59
Voltage Unbalance 47
Phase Rotation/Df-Dt
PROTECTION DEVICES
SEG MCGDV4
or equivalent
GCP PANEL
Control room
GENERATOR PROTECTIONS
Generator Differantial Current 87G
Overvoltage Relay 59
Undervoltage Relay 27
Synchronism-Check 25
Over Frequency 81O
Under Frequency 81U
Reverse Power 32R
Phase Balance Current Relay 46
Ins. Overcurrent Relay 50 67
Residual Overvoltage 59N
Loss of Excitation 40
Ground Overcurrent Time Delay 50N 51G
Over Excitation Protection 24
Bearing Protection (PLC) 38
Stator Thermal Protection (PLC) 49S
Over Current With Time Delay 51
Earth Fault Diff. Protection 87N
Breaker Failure 50BF

GENERAL NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY — POSITIVE ENERGY

DESIGNER

N22

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

SIZE	SCALE
2A0	–

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
4	10.02.2026	FOR APPROVAL	M.G.	C.U.	M.S.
3	26.12.2025	FOR APPROVAL	M.G.	C.U.	M.S.
2	08.10.2025	FOR APPROVAL	M.G.	C.U.	M.S.
1	29.09.2025	FOR REVIEW	M.G.	C.U.	M.S.
0	22.09.2025	FOR REVIEW	M.G.	C.U.	M.S.

DRAWING NUMBER:
ABA-ENG-ELC-SLD-0001

SHEET:
3
OF:
3

DRAWING NAME:
PLANT SINGLE LINE DRAWING
(MV/LV)

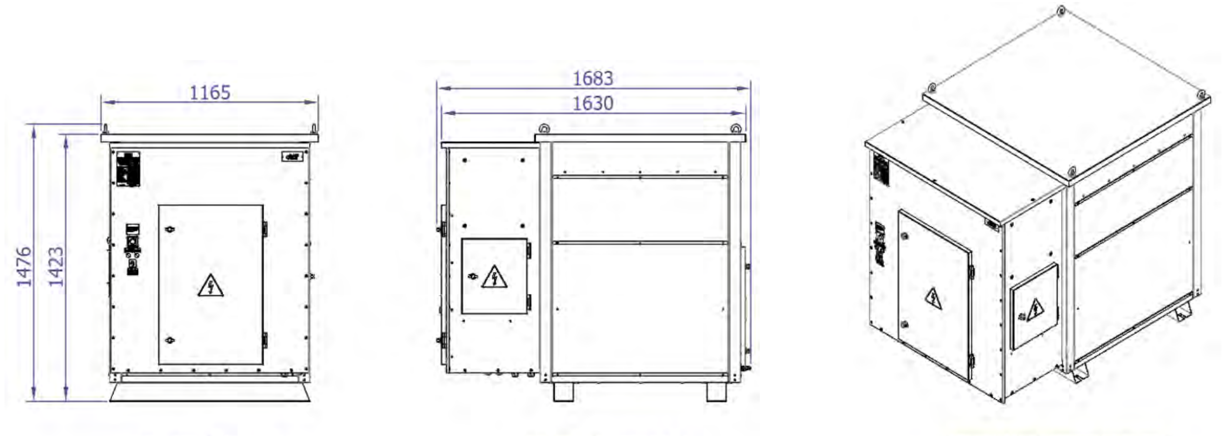
SPECIFICATION SHEET

Date: 05.12.2025
Document Nr: 13-25122945-0P-2
Revision Nr: 0

Neutral Grounding Resistor

Brand	**Aktif**	
Product Code	NGR3H-AH-025-10-319	
Rated Voltage	13,8 /√3	
B.I.L. (EN 60071 – EN 60060)	17,5 / 38 / 95	
Ohmic Value (at 20 °C) (±10 %)	319	
Rated Short Time Current	25	
Operating Duration	10	
Rated Continuous Current	1	A
Duty Cycle	25 A 10 sec.per Hour	
Resistor Material	CrAl Stainless Steel	
Resistor Type	Wirewound	
Insulation Material (EN 60273)	Insulators and air	
Main Standard	IEEE Std. C57.32a-2020	
Resistor Temperature Rise After Operation	< 760	°C
Max. Ambient Temperature	55	°C
Increasing Ratio of Resistance at Maximum Temperature	< 5	%
Current Transformer (IEC 61869-2)	30/1A 5P10 10VA	1 Pc
Voltage Transformer (IEC 61869-3)	-	
Motorized Disconnector Switch	24 kV 630A 16kA/3sec 2NO+2NC (Vm:220Vac)	1 Pc
Heater / Thermostat	Included	1 Pc
Overcurrent Relay (50/51N)	-	
Overvoltage Relay (59)	-	
Surge Arrester (IEC 60099)	-	
Protection Degree (EN 60529)	IP23	
Installation	Indoor & Outdoor	
Input / Output Type	Bottom / Side	
Enclosure	2mm Sheet Steel	
Finish (EN 10346)	Hot Dip Zinc Coating & RAL7035/C3	
Weight	~650	kg
Dimensions (W x L x H)	1165 x 1683 x 1476	mm
Warranty	24	months

3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx specified 796 ohms



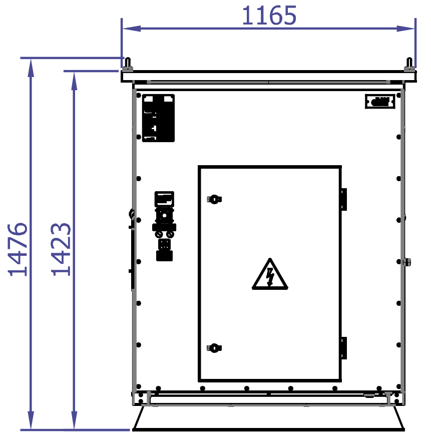
Front View (Ön Görünüm)   Side View (Yan Görünüm)   Isometric View (İzometrik Görünüm)

Quality Management System Certification / ISO 9001:2015 SigmaCert /Turkey

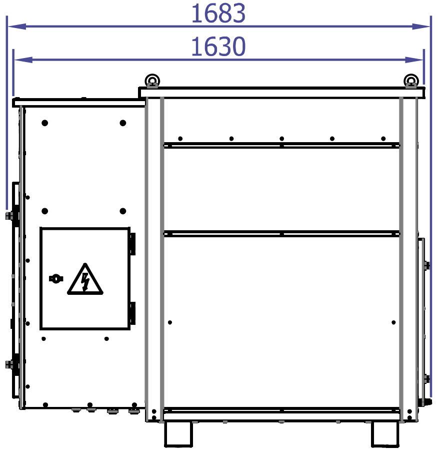
Environmental Management System Certification / ISO 14001:2015 SigmaCert /Turkey

Occupational Health and Safety Management System Certification / ISO 45001:2018 SigmaCert /Turkey

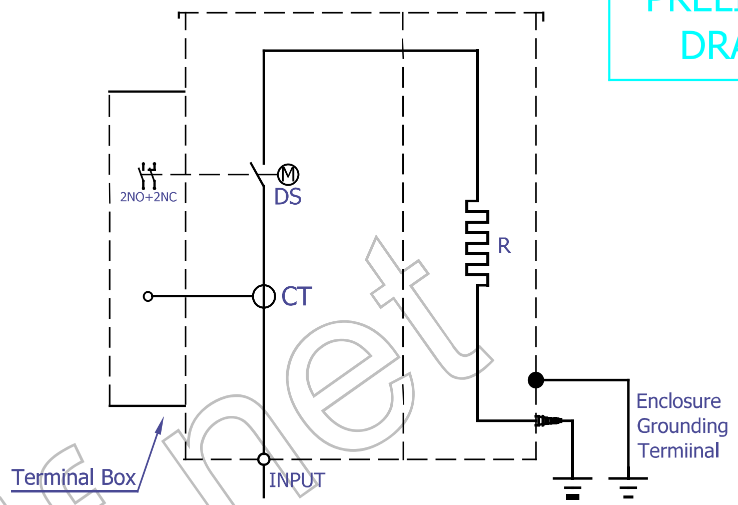
PRELIMINARY DRAWING


1165
1476
1423

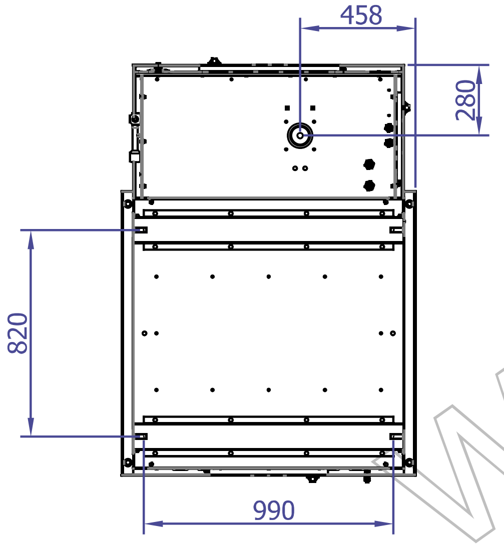
Front View (Ön Görünüm)



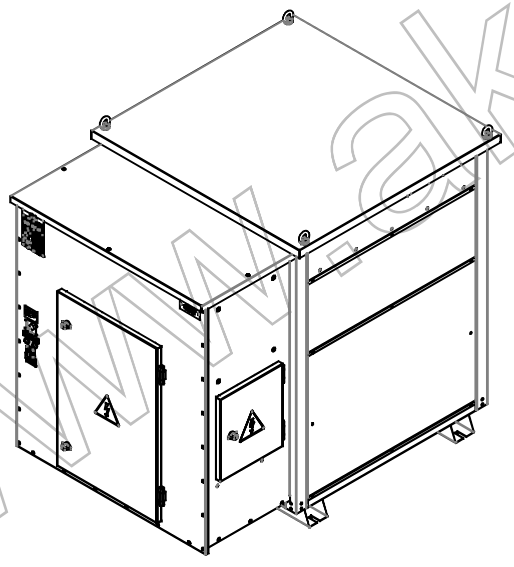
Side View (Yan Görünüm)


2NO+2NC
M
DS
R
CT
Enclosure Grounding Termiinal
Terminal Box
INPUT
OUTPUT

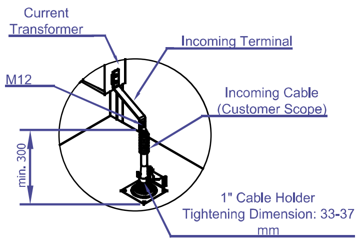
Single-Line Diagram
(Tek Hat Şeması)


458
280
820
990

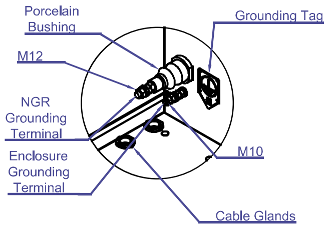
Bottom View (Alt Görünüm)



Isometric View (İzometrik Görünüm)


Current Transformer
Incoming Terminal
M12
Incoming Cable (Customer Scope)
min. 300
1" Cable Holder Tightening Dimension: 33-37 mm

Input Terminal Detailed View
(Giriş Terminali Detay Görünüm)


Porcelain Bushing
Grounding Tag
M12
NGR Grounding Terminal
Enclosure Grounding Terminal
M10
Cable Glands

Output Terminal Detailed View
(Çıkış Terminali Detay Görünüm)

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www.aktif.net

PRODUCT CODE / *Ürün Kodu*: – – –

MANUFACTURER / *Üretici*

aktif ELEKTROTEKNİK

CUSTOMER / *Müşteri*
– – –
– – –

END USER / *Son Kullanıcı*
– – –
– – –

REV. NR *Rev. No*	REV. DATE *Rev. Tarihi*	DESIGNER *Tasarlayan*	DRAWER *Çizen*	CHECK *Kontrol Eden*	APPROVER *Onaylayan*
00	05.12.2025	R.Keskin	N.Özdin	S.Ergin	Ş.Erişir
– –	– . – . – –	– – –	– – –	– – –	– – –
– –	– . – . – –	– – –	– – –	– – –	– – –
– –	– . – . – –	– – –	– – –	– – –	– – –
– –	– . – . – –	– – –	– – –	– – –	– – –

TYPE *Tip* : NGR3H-AH-025-10-319
PRODUCT *Ürün Bilgisi* : 13,8/√3 kV 25 A 10 Sec. 319 Ohm
Neutral Grounding Resistor
TITLE *Başlık* : Technical Drawing / Teknik Resim
NOTE 1 *Not 1* : – – –
NOTE 2 *Not 2* : – – –

A4
UNIT *Birim*: mm

PROJECT-SHEET *Proje-Sayfa*: 01 - 01 / 01
TOLERANCE *Tolerans*: % 2
SERIAL NR. / *Seri No*: – – –
DRAWING NR. / *Resim No*: 13-252945-0T

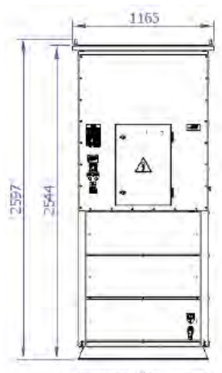
SPECIFICATION SHEET

Date: 05.12.2025
Document Nr: 13-25122945-0P-1
Revision Nr: 0

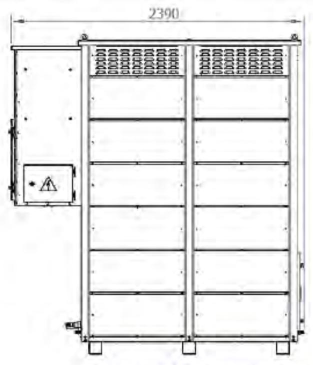
Neutral Grounding Resistor

Brand	**Aktif**	
Product Code	NGR12-AH-1K0-10-19,9	
Rated Voltage	34,5 /√3	
B.I.L. (EN 60071 – EN 60060)	24 / 50 / 125	
Ohmic Value (at 20 °C) (±10 %)	19,9	
Rated Short Time Current	1000	
Operating Duration	10	
Rated Continuous Current	40	
Duty Cycle	1000 A 10 sec.per Hour	
Resistor Material	AISI304 Stainless Steel	
Resistor Type	Grid	
Insulation Material (EN 60273)	Insulators and air	
Main Standard	IEEE Std. C57.32a-2020	
Resistor Temperature Rise After Operation	< 760	°C
Max. Ambient Temperature	55	°C
Increasing Ratio of Resistance at Maximum Temperature	< 67	%
Current Transformer (IEC 61869-2)	1000/5A 5P10 10VA	1 Pc
Voltage Transformer (IEC 61869-3)	-	
Motorized Disconnector Switch	24 kV 1250A 25kA/3sec 2NO+2NC (Vm:220Vac)	1 Pc
Heater / Thermostat	Included	1 Pc
Overcurrent Relay (50/51N)	-	
Overvoltage Relay (59)	-	
Surge Arrester (IEC 60099)	-	
Protection Degree (EN 60529)	IP23	
Installation	Indoor & Outdoor	
Input / Output Type	Bottom / Side	
Enclosure	2mm Sheet Steel	
Finish (EN 10346)	Hot Dip Zinc Coating & RAL7035/C4H	
Weight	~1600	kg
Dimensions (W x L x H)	1165 x 2390 x 2597	mm
Warranty	24	months

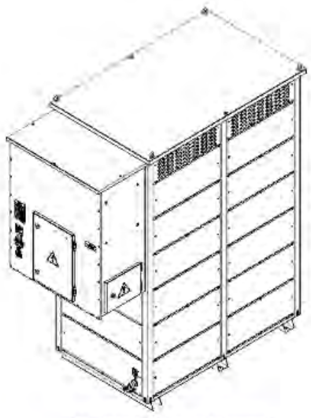
3.3.7 of Global_Bahamas_Technical Specification & Schedules_R00.docx specified 796 ohms



Front View (Ön Görünüm)



Side View (Yan Görünüm)



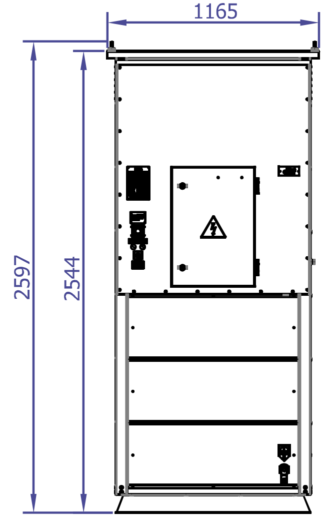
Isometric View (İzometrik Görünüm)

Quality Management System Certification / ISO 9001:2015 SigmaCert /Turkey

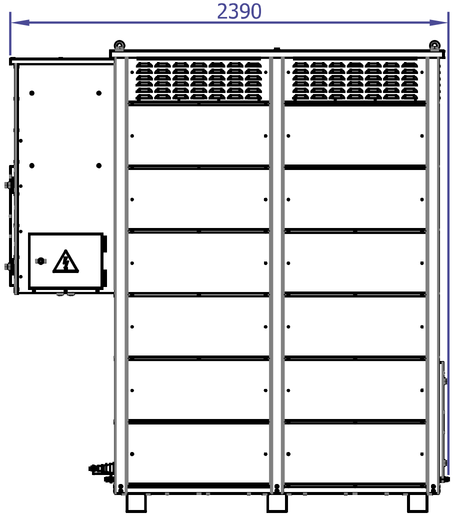
Environmental Management System Certification / ISO 14001:2015 SigmaCert /Turkey

Occupational Health and Safety Management System Certification / ISO 45001:2018 SigmaCert /Turkey

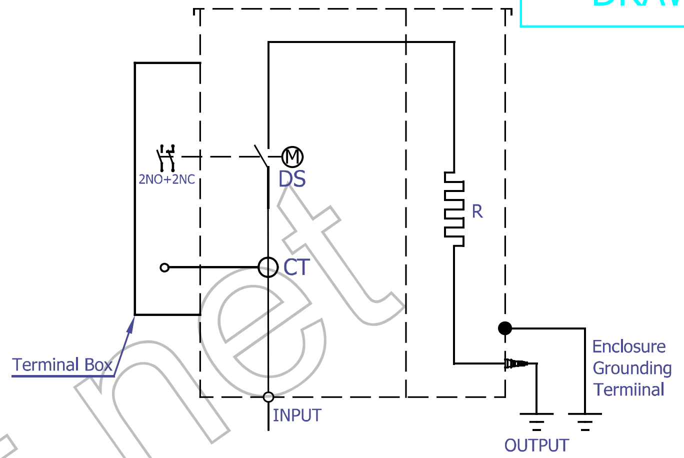
PRELIMINARY DRAWING


1165
2597
2544

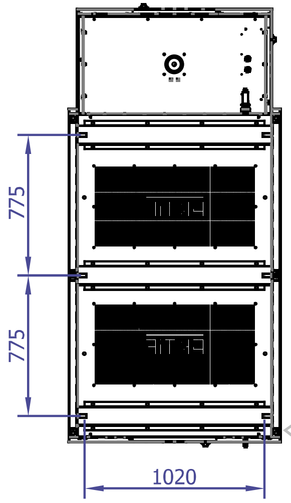
Front View (Ön Görünüm)



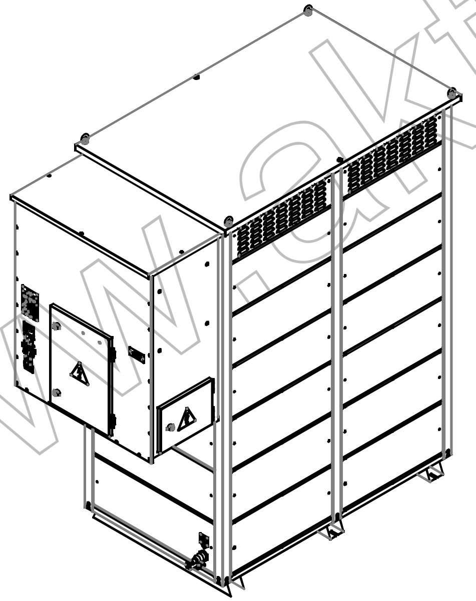
Side View (Yan Görünüm)


2NO+2NC
DS
R
CT
Terminal Box
INPUT
Enclosure Grounding Termiinal
OUTPUT

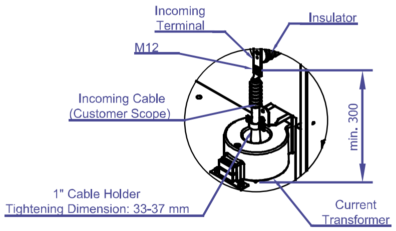
Single-Line Diagram (Tek Hat Şeması)


775
775
1020

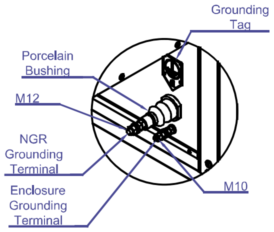
Bottom View (Alt Görünüm)



Isometric View (İzometrik Görünüm)


Incoming Terminal
Insulator
M12
Incoming Cable (Customer Scope)
min. 300
1" Cable Holder Tightening Dimension: 33-37 mm
Current Transformer

Input Terminal Detailed View
(Giriş Terminali Detay Görünüm)


Grounding Tag
Porcelain Bushing
M12
NGR Grounding Terminal
Enclosure Grounding Terminal
M10

Output Terminal Detailed View
(Çıkış Terminali Detay Görünüm)

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www.aktif.net

PRODUCT CODE / *Ürün Kodu*
- - -

MANUFACTURER / *Üretici*

ELEKTROTEKNİK

CUSTOMER / *Müşteri*
___
___

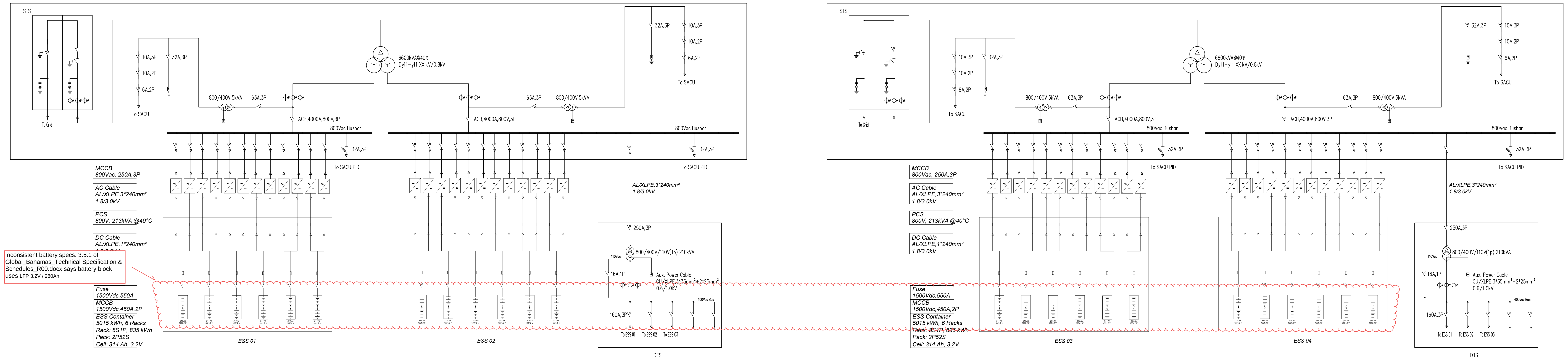
END USER / *Son Kullanıcı*
___
___

REV. NR *Rev. No*	REV. DATE *Rev. Tarihi*	DESIGNER *Tasarlayan*	DRAWER *Çizen*	CHECK *Kontrol Eden*	APPROVER *Onaylayan*
00	05.12.2025	R.Keskin	N.Özdin	S.Ergin	Ş.Erişir
__	_._._	___	___	___	___
__	_._._	___	___	___	___
__	_._._	___	___	___	___
__	_._._	___	___	___	___

TYPE *Tip* : NGR12-AH-1K0-10-20
PRODUCT *Ürün Bilgisi* : 34,5/√3 kV 1000 A 10 Sec. 20 Ohm
Neutral Grounding Resistor
TITLE *Başlık* : Technical Drawing / Teknik Resim
NOTE 1 *Not 1* : ___
NOTE 2 *Not 2* : ___

A4
UNIT *Birim* mm

PROJECT-SHEET *Proje-Sayfa* 01 - 01 / 02
TOLERANCE *Tolerans* % 2
SERIAL NR. / *Seri No* ___
DRAWING NR. / *Resim No* 13-252945-0T


STS
To Grid
10A,3P
10A,2P
6A,2P
To SACU
32A,3P
800/400V 5kVA
63A,3P
6600kVA@40℃
Dy11−y11 XX kV/0.8kV
ACB,4000A,800V,3P
800Vac Busbar
32A,3P
To SACU PID
MCCB
800Vac, 250A,3P
AC Cable
AL/XLPE,3*240mm²
1.8/3.0kV
PCS
800V, 213kVA @40°C
DC Cable
AL/XLPE,1*240mm²
1.8/3.0kV
Fuse
1500Vdc,550A
MCCB
1500Vdc,450A,2P
ESS Container
5015 kWh, 6 Racks
Rack: 8S1P, 835 kWh
Pack: 2P52S
Cell: 314 Ah, 3.2V
314 Ah
1331.2 V
ESS 01
ESS 02
ESS 03
ESS 04
AL/XLPE,3*240mm²
1.8/3.0kV
250A,3P
800/400V/110V(1p) 210kVA
110Vac
16A,1P
Aux. Power Cable
CU/XLPE,3*35mm²+2*25mm²
0.6/1.0kV
400Vac Bus
160A,3P
To ESS 01
To ESS 02
To ESS 03
DTS

Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah

KEY-PLAN

REFERENCE DRAWINGS

LEGEND

GENERAL NOTES

1. THE DESIGN IS PRELIMINARY NOT THE FINAL DESIGN

CLIENT

CONTRACTOR

DESIGNER

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

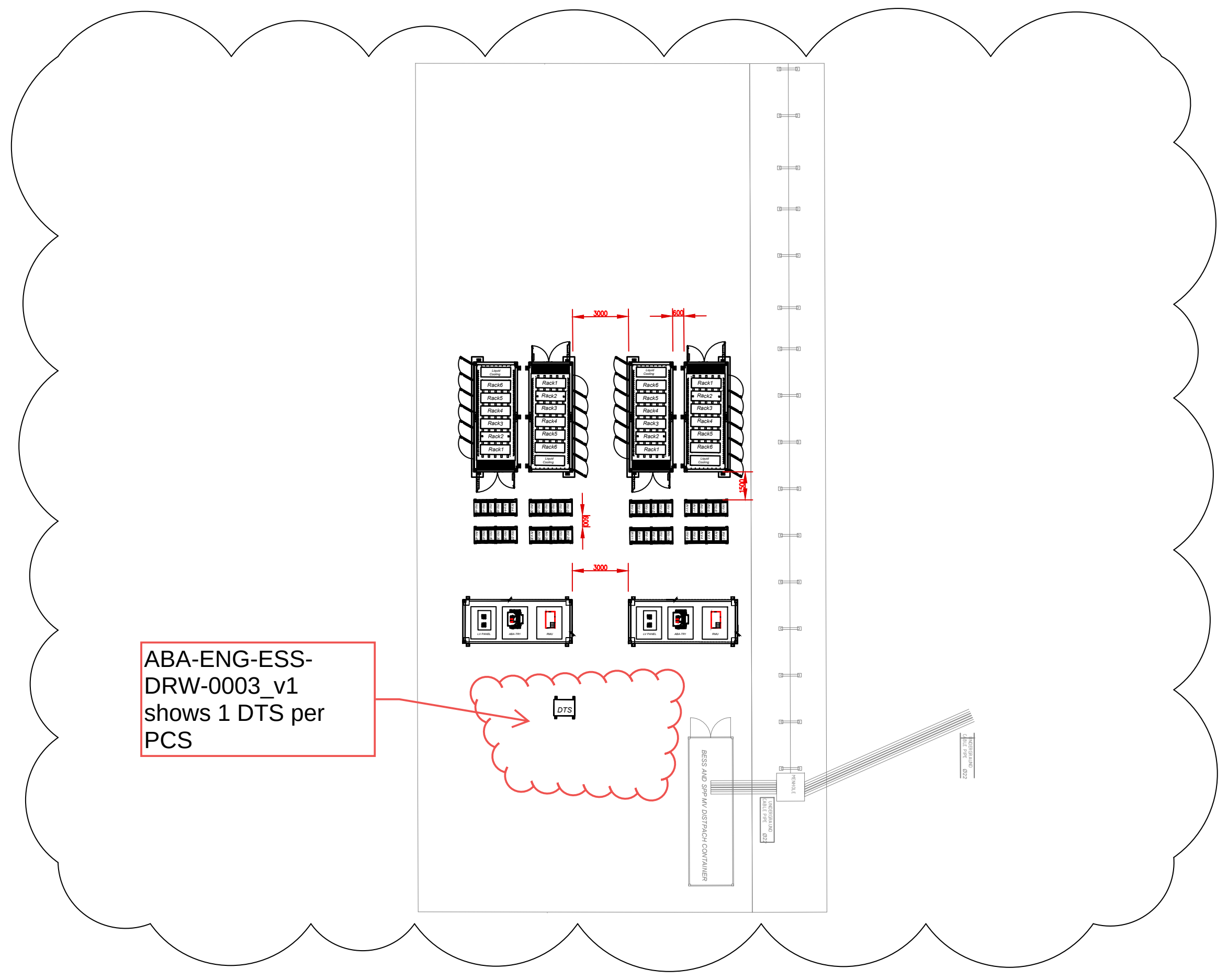
SIZE	SCALE
A0	

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
0	04 Oct 25	FOR APPROVAL	S.T	A.Y	T.S

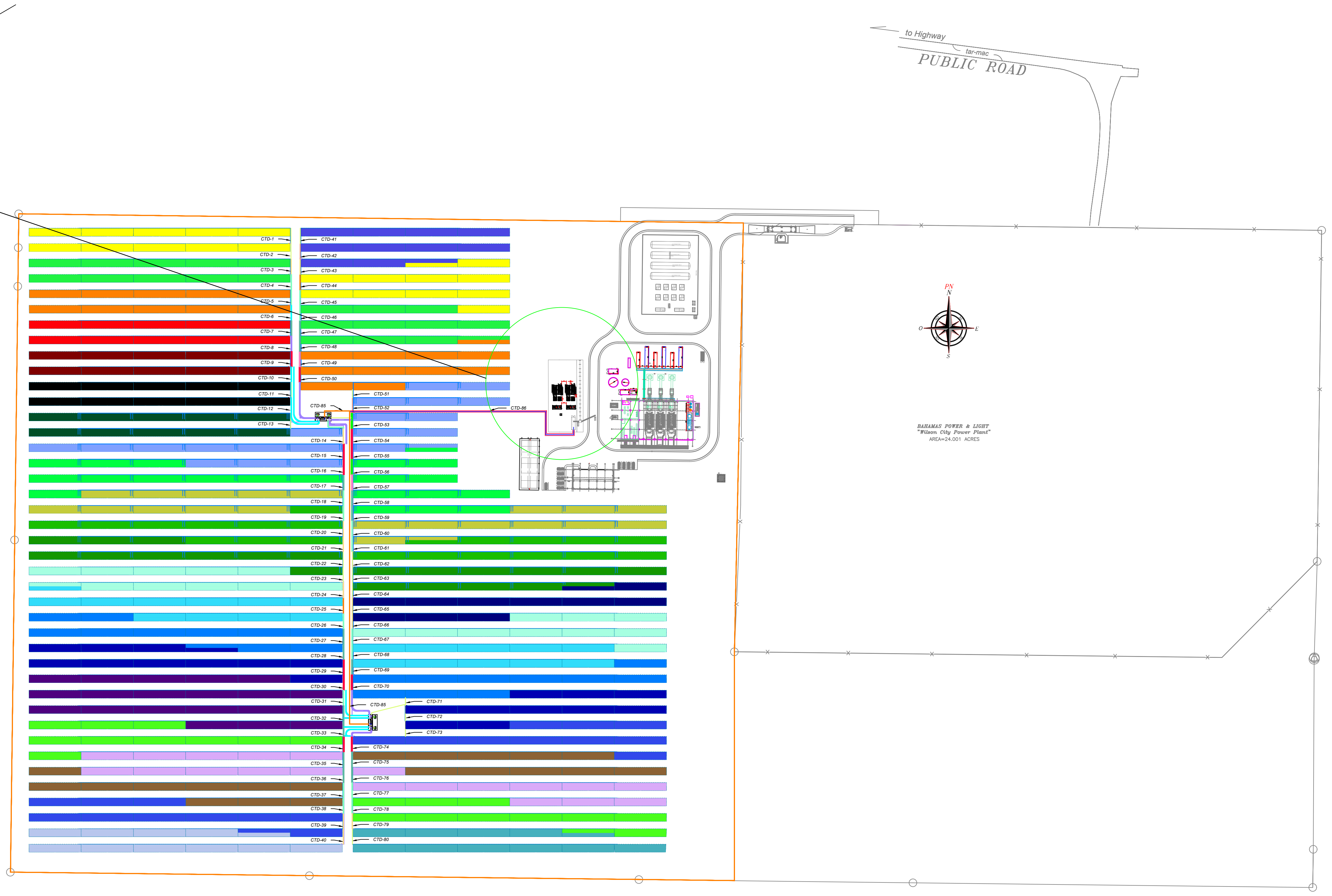
DRAWING NUMBER:
ABA-ENG-ESS-DRW-0003

SHEET: 1
OF: 1

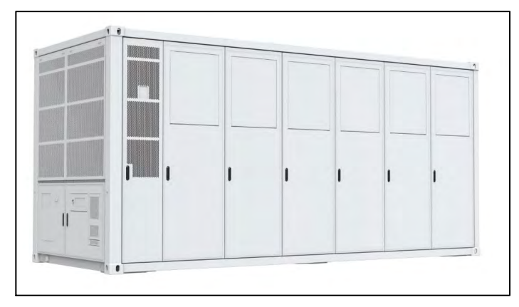
DRAWING NAME:
Abaco BESS Single Line Diagram



ABA-ENG-ESS-DRW-0003_v1 shows 1 DTS per PCS



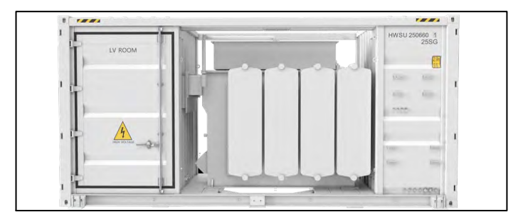
ESS INFORMATION



Energy Storage System	HUAWEI LUNA2000-5015-2S
Dimension (W x H x D)	20 ft high cube container:2896 mm x 6058 mm x 2438 mm
Total Number of Racks	6
Total Number of Pack	8

LUNA2000-5015-2S ELECTRICAL VALUES	
Rated Voltage @DCDC bus side	1331.2V
Maximum Voltage @DCDC bus side	1500V
Battery Capacity	5015 kWh (314 Ah Cells)
Charge & Discharge Rate	≤0.5CP
Communication Interface	Ethernet / SFP
System Communications Protocol	Modbus TCP

STS INFORMATION



Smart Transformer System	HUAWEI STS-6000KTL-H1
Dimension (W x H x D)	6058 X 2438 X 2896 mm
Weight	< 22 t
Opearting Temperature Range	-25°C~ 55°C

JUPITER-6000K-H1 ELECTRICAL VALUES	
AC Capacity	6600 kVA @40°C
Rated Input Voltage	800 V AC
Rated Output Voltage	35 kV
Transformer Cooling Type	ONAN
Transformer Type	Oil-immersed
Rated Frequency	60 Hz

INVERTER INFORMATION

INVERTER	HUAWEI SUN2000-213KTL-H0
Dimension (W x H x D)	875 x 865 x 365 mm
Total Number of Inverters	48
Total Number of ESS Containers	4

INVERTER ELECTRICAL VALUES	
INPUT (DC)	
Rated Voltage	1331V
Operating Voltage Range	800V - 1500V
Max. Voltage	1500 V
Maximum Current	218.5 A
Maximum Number of Inputs	1
AC OUTPUT	
Rated Output	213 W @40°C; 192 W @50°C
Maximum Apparent Power	236.4 VA
Rated Voltage	800 V
Maximum Current	170.6 A

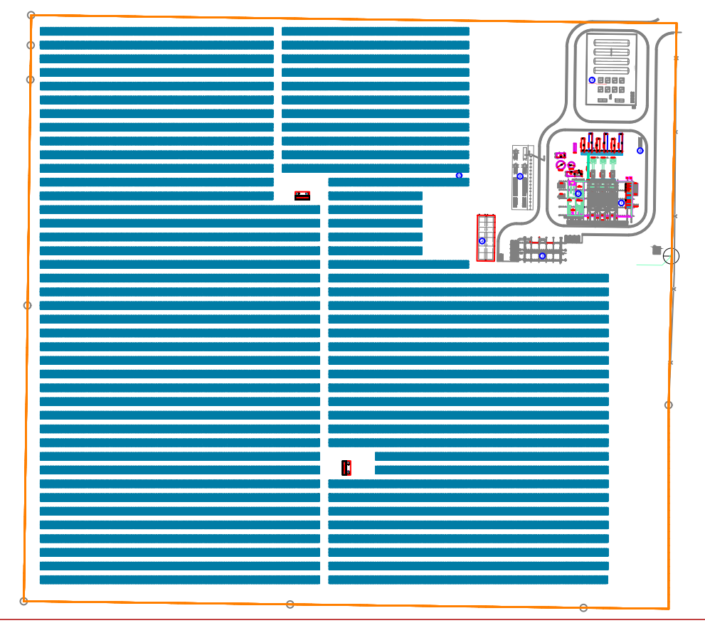
Do not align with Luna2000-213KTL.pdf i.e. Model: LUNA2000-213KTL-H0

DTS INFORMATION

Distribution Transformer Station	HUAWEI
Dimension (W x H x D)	900 x 2100 x 1200 mm
Weight	< 1.3 t
Opearting Temperature Range	-25°C~ 55°C

DTS ELECTRICAL VALUES	
AC Power	210 kVA@ 400 Vac / 4 kVA@ 110 Vac
Rated Input Voltage	800 V AC
Max. Input Current at Nominal Voltage	151.6 A
Transformer Cooling Type	AF
Rated Output Voltage	400V (3P) /110V (1P)
Rated Frequency	60 Hz

KEY-PLAN



REFERENCE DRAWINGS

LEGEND

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. CABLE TRENCH FOR THE BESS IS NOT DRAWN YET.
3. THE DESIGN IS PRELIMINARY NOT FOR CONSTRUCTION

CLIENT

E A ENERGY

CONTRACTOR

ILTEKNO
ADVANCED TECHNOLOGY – POSITIVE ENERGY

DESIGNER

ILTEKNO SOLAR

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

ILTEKNO SOLAR

SIZE	SCALE
A0	1:1500

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
0	7.11.25	FOR INFORMATION	S.T	A.Y	T.S

DRAWING NUMBER: ABA-ENG-ESS-DRW-0004

SHEET: 1
OF: 1

DRAWING NAME: Battery Energy Storage System Layout Plan

ESTIMATED

Incomplete

Project Name:	Abaco Regasification Facility		
Item No	Description	Unit	Quantity
A	**CABLE TRAY & CONDUITS**		
1	200mm Hot Dipped Galvinized Cable Ladder incl. Accessories	m	200
2	100mm Hot Dipped Galvinized Cable Ladder incl. Accessories	m	200
3	50mm Hot Dipped Galvinized Cable Tray incl. Accessories	m	200
4	1 1/2" EMT Pipe incl. Accessories	m	100
5	1" EMT Pipe incl. Accessories	m	250
8	Steel Support Manufacturing	kg	250
B	**LV CABLES**		
14	4x35mm² NYRY	m	400
15	5x16mm² NYRY	m	400
16	4x10mm² NYRY	m	200
17	8x2,5mm² NYRY	m	1000
C	**CONTROL CABLES**		
26	12x2x1.5mm² RE-2Y(ST)YSWAY-fl-PIMF	m	1000
27	12x2x1.5mm² RE-2Y(ST)YSWAY-fl	m	1000
28	2x2x1.5mm² RE-2Y(ST)YSWAY-fl-PIMF	m	2000
29	3x1.5mm² RE-2Y(ST)YSWAY-fl	m	1500
D	**EQUIPMENT GROUNDING CABLES**		
1	2,5mm² NYAF, 450V	m	500
2	6mm² NYAF, 450V	m	100
3	16mm² NYAF, 450V	m	100
5	95mm² NYAF, 450V	m	100
E	**FIRE DETECTION SYSTEM**		
1	Adressable Fire Alarm Button	pc	2
2	Sounder	pc	1
3	Monitoring Module	pc	1
4	2x2x0,8+0,8 mm Je-H(St)H Fe180 Ph120	m	200
5	2x1,5² LIHCH FE180 PH120 cable	m	100
6	Ex proof Gas Detector	pc	6
7	Ex proof Flame Detector	pc	6
F	**FOUNDATION EARTHING SYSTEM**		
1	30x3,5 mm² Galvanized Strip Conductor	m	600
2	Copper Earthing Rod (Ø20 mm L= 3mt)	pc	15
3	95mm² stranded bare copper	m	250
4	Cadweld Connection	set	15
5	Equipotential Busbar 300x40x5 mm	pc	10
6	Connection Clamps and other accessories	set	1
G	**OUTDOOR LIGHTING & SMALL POWER SYSTEM & OTHER EXPROOF MATERIALS**		
7	Ex proof lighting box 4 hole	pc	20
8	Ex proof Connection Box 500x200x150 (2 incoming, 10 outgoing hole)	pc	6
9	Ex proof Gland 1-1/2''	pc	6
10	Ex proof Gland 1''	pc	10
11	Ex proof Gland 3/4''	pc	10
12	Ex proof Gland 1/2''	pc	30
13	Ex proof Gland 1/4''	pc	30
14	Ex proof Gland 1/4''	pc	20
5	Exproof Junction Box	pc	10
6	Ex proof 16A Monofaze Socket	pc	4
7	Ex proof 32A Trifaze Socket	pc	3

BATTERY CELL

Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah

	Technical Specification
[illegible]	LFP
[illegible]	(173.7-174.7)mm*(71.4-71.7)mm * (206.8-207.3)mm：Tolerances 0.5mm
[illegible]	5.6 kg
[illegible]	314 Ah
[illegible]	3.2 V
[illegible]	1004.8Wh
[illegible]	2.5 V ~ 3.6 V
[illegible]	CP
Charging Temperature	0°C ~ 65°C
Discharging Temperature	-30°C ~ 65°C
Internal Resistance	≤0.3mΩ @25°C, 1kHz
Monthly Self-consumption	≤2%/month @25°C

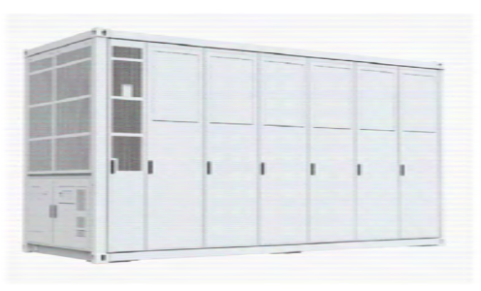
BATTERY PACK

Battery Pack	Technical Specification
Configuration	2P 52S
Dimension (W x H x D)	785 × 249 × 2135 mm
Weight	≤710 kg
Nominal Capacity	314 Ah
Nominal Voltage	166.4 V
Nominal Energy	104.5 kWh

BATTERY RACK

Battery Rack	Technical Specification
Configuration	1P 8S
Dimension (W x H x D)	875 × 2496 × 2200 mm
Nominal Capacity	314 Ah
Nominal Voltage	1331.2 V
Nominal Energy	836 kWh
Operational Voltage	1123.2 V ~ 1497 V

ESS CONTAINER

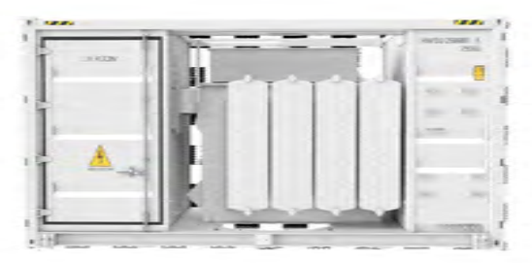


System	Technical Specification
Model	LUNA2000-5015-2S
Number of Battery Racks	6
DC Rated Voltage	1331.2 V
DC Max. Voltage	1500 V
Nominal Energy Capacity	5015 kWh
Charge & Discharge Rate	≤ 0.5 Cp
Rated Power	2507 kW
Dimension (W x H x D)	6058 × 2896 × 2438 mm
Weight	≤ 43 t
Operation Temperature Range	-30°C ~ 55°C (-30°C can be started)
Storage Temperature Range	-35°C ~ 60°C (With Coolant) -40°C ~ 60°C (Without Coolant)
Relative Humidity	0 ~ 100% (Non-condensing)
Max. Operating Altitude	4700 m
Cooling Method	Liquid Cooling
Fire Suppression System	Water Sprinkler, Novec 1230
Communication Interface	Ethernet / SFP
Communication Protocol	Modbus TCP
Protection Degree	IP55
Anti-corrosion Degree	C5-Medium

PCS (POWER CONVERSION SYSTEM)

PCS	Technical Specification
Model/ Name	LUNA2000-213KTL-H0
Maximum efficiency	99.01%
Rated DC Voltage	1331 V
Max. DC Voltage	1500 V
Operating DC Voltage Range	800V ~ 1,500 V
Maximum DC current	218.5 A
Max. Number of Inputs	1
Rated AC Active Power	213,000 W @40°C; 192,000 W @50°C
Rated AC voltage	800 Vac, 3W + PE
Rated AC frequency	50 Hz / 60 Hz
Maximum AC current	170.6A
Adjustable Power Factor Range	1 leading and 1 lagging
Maximum total harmonic distortion	THDi < 1.5%
AC Overcurrent Protection	Yes
DC Reverse-polarity Protection	Yes
Insulation Resistance Detection	Yes
Residual Current Protection	Yes
DC Surge Protection1	Type II
AC Surge Protection1	Type II
Display	LED Indicators, WLAN + APP
USB	Yes
Ethernet	Yes
Dimensions (H x W x D)	875 x 865 x 365 mm
Net weight	< 100 kg
Operating temperature	–25°C to +60°C
Cooling method	4000 m
Maximum operating altitude	Smart air cooling
Relative humidity	0%–100%
DC Connector	OT/DT terminal
AC Connector	OT/DT terminal
Protection Degree	IP66
Topology	Transformerless

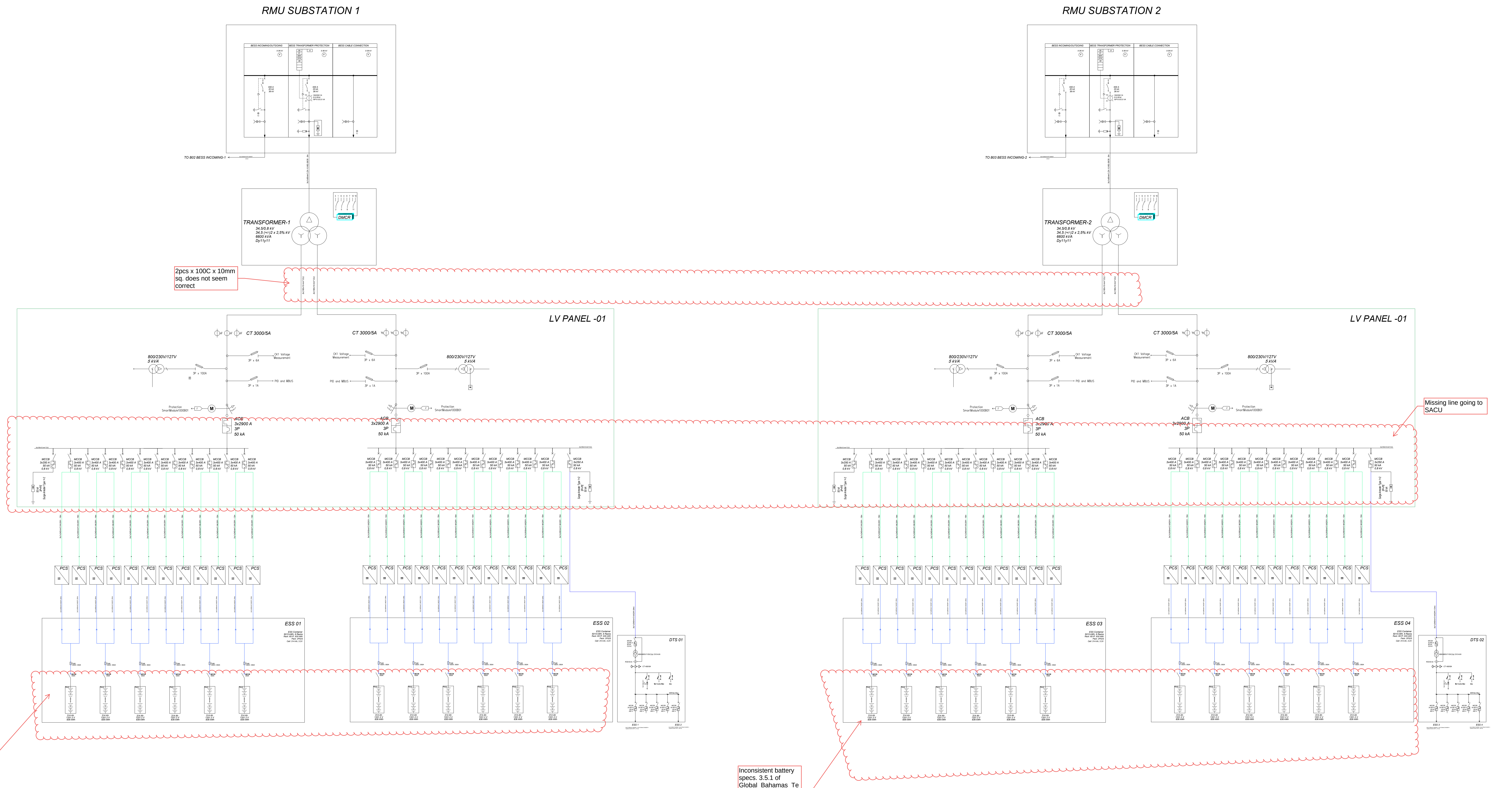
STS (SMART TRANSFORMER STATION)



STS	Technical Specification		
STS model	JUPITER-9000K-H1	STS-6000KTL-H1	STS-3000KTL-H1
Available Inverters / PCS	SUN2000-213KTL-H0		
Maximum MCCB Inputs	30	22	11
AC capacity	9000 kVA @40°C	6600 kVA@40°C	3300 kVA@40°C
Rated input voltage	800 V AC		
Rated output voltage	10-35 kV		
Frequency	50 /60Hz		
Transformer type	Oil-immersed, Conservator Type		
Transformer cooling type	ONAN		
Tappings	±2 x 2.5%		
Transformer oil type	Mineral oil (PCB-free)		
Transformer vector group	Dy11-y11	Dy11-y11	Dy11
Transformer monitoring and protection	Oil level, oil temperature, oil pressure and buchholz		
Protection Degree of MV & LV Room	IP54		
MV relay protection	50/51, 50 N/51 N		
LV overvoltage protection	Type I+II		
Dimensions (H x W x D)	6058 mm x 2438 mm x 2896 mm		
Weight	< 28 t	< 22 t	< 15 t
Operating temperature range	–25°C to +55°C		
Maximum operating altitude	2000 m	1000 m	1000 m
LV & MV Room Cooling	Smart Cooling without Air-across for Higher Availability		
Communications	Modbus TCP		

DTS (DISTRIBUTION TRANSFORMER SYSTEM)

DTS	Technical Specification
AC Power	210 kVA@ 400 Vac / 4 kVA@ 110 Vac
Rated Input Voltage	800 Vac
Max. Input Current at Nominal Voltage	151.6 A
Rated Output Voltage	400V (3P) /110V (1P)
Rated Frequency	50Hz/60Hz
Transformer Type	Dry Type
Transformer Cooling Type	AF
Transformer Vectoring Group	Dyn11yn11
Transformer Tappings	± 2 x 2.5%
Transformer Winding	Al
Transformer Insulation Class	H
Transformer Impedance (at 145°C)	4%（±10%）@50Hz / 4.8%（±10%）@60Hz
Transformer No-load Loss	≤ 500 W (+15%)
Transformer Load Loss	≤ 3,044 W (+15%）
Number of outputs	Five MCCBs, each connected to two outputs
Cabling mode	Routed in and out from the bottom
Protection Degree	IP 55
LV SPD	Type II
Transformer Protection	Transformer Temperature Protection
Operating Temperature Range	- 25 ~ 55 (-13°F ~ 131°F)
Relative Humidity	0% ~ 95%
Max. Operating Altitude	4,000 m
Dimensions (W x H x D)	900 x 2,100 x 1,200 mm
Weight	< 1.3 t
Communication Mode	Dry Contacts
Cooling Type	Smart Cooling without Air-across for Higher Availability
Applicable Standards	IEC 60076, IEC 61439



2pcs x 100C x 10mm sq. does not seem correct

Missing line going to SACU

Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah

Inconsistent battery specs. 3.5.1 of Global_Bahamas_Technical Specification & Schedules_R00.docx says battery block uses LFP 3.2V / 280Ah

KEY-PLAN

REFERENCE DRAWINGS

1. ABA-ENG-ESS-CAL-0001 - DC CABLE CALCULATION
2. ABA-ENG-ESS-CAL-0002 - LV CABLE CALCULATIONS
3. ABA-ENG-ESS-CAL-0003 - MV CABLE CALCULATIONS
4. ABA-ENG-ESS-DRW-0004 - ESS GENERAL LAYOUT
5. ABA-ENG-ESS-CAL-0005 - PRIMARY CALCULATIONS
6. ABA-ENG-ESS-CAL-0012 - BATTERY COMPATIBILITY CALCULATIONS
7. ABA-ENG-ELC-CALL-0001-REV.0-SHORT CIRCUIT CALCULATIONS

LEGEND

- Circuit Breaker
- Battery Rack
- Fuse
- PCS (Power Conversion System)
- Current Transformer
- Transformer
- Auxiliary Transformer
- Load Break Switch with Fuses
- Voltage Indicator

GENERAL NOTES

1. Surge Protection Devices (SPDs) are included within the OEM (Huawei) integrated design scope. SPD bonding and PE connections are implemented in accordance with OEM requirements and coordinated with the plant earthing system

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY · POSITIVE ENERGY

DESIGNER

iLTEKNO SOLAR

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

iLTEKNO SOLAR

SIZE	SCALE
A0	

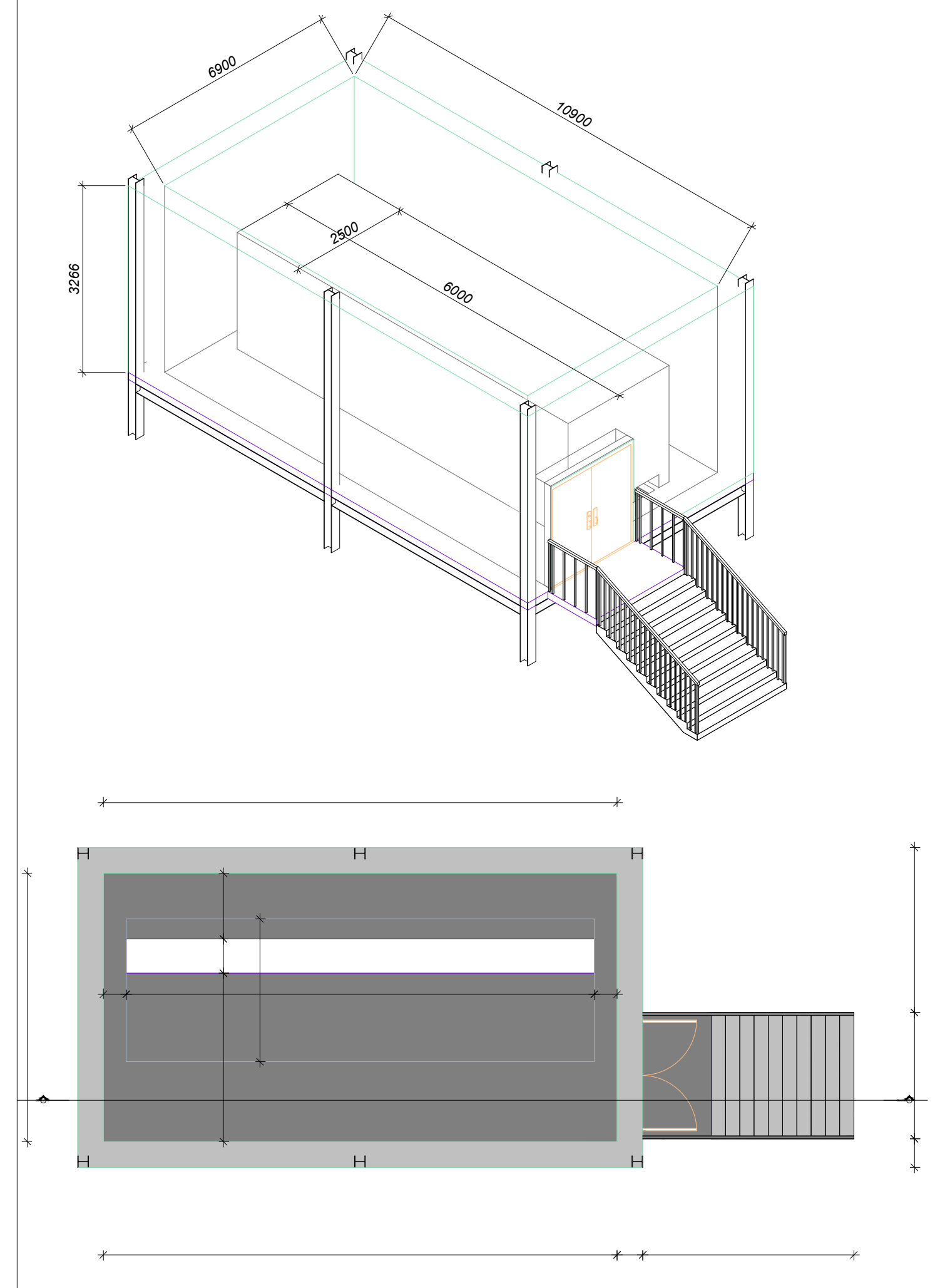
REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	3 Mar 26	FOR APPROVAL	S.T	A.Y	T.S
1	17 Feb 26	FOR APPROVAL	S.T	A.Y	T.S
0	29 Dec 25	FOR APPROVAL	E.C	A.Y	T.S

DRAWING NUMBER: ABA-ENG-ESS-DRW-0003

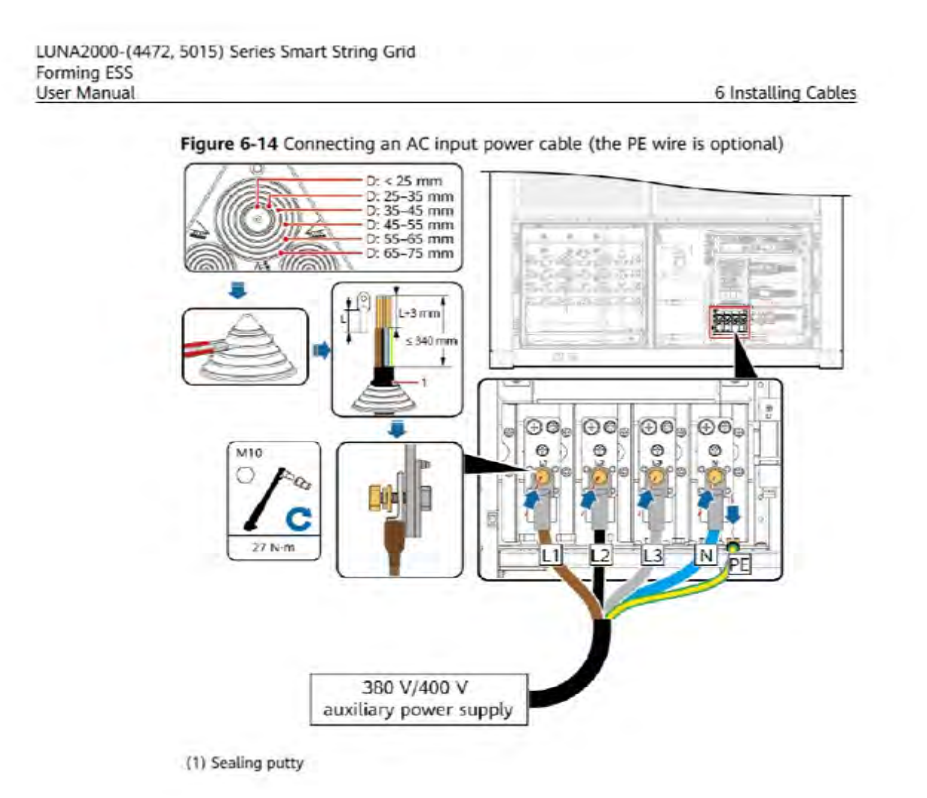
SHEET: 1

OF: 1

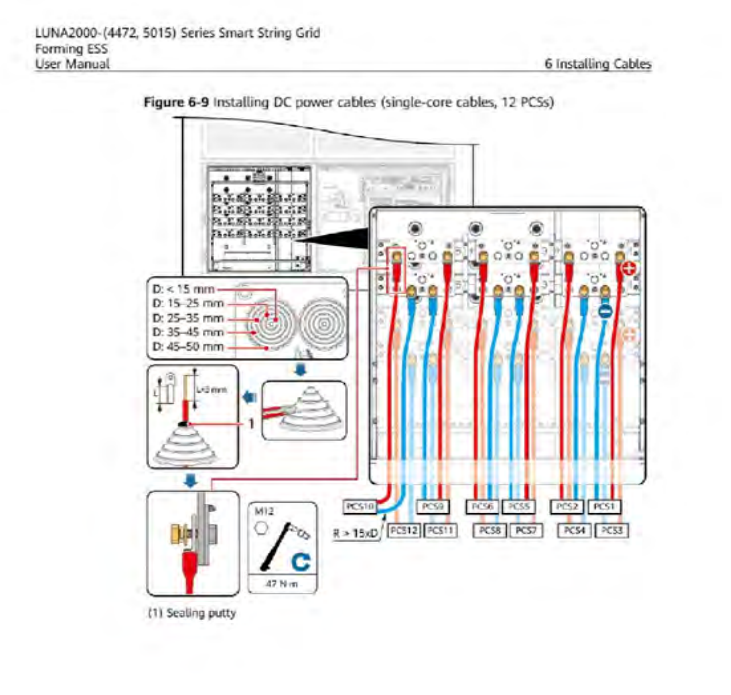
DRAWING NAME: Abaco BESS Single Line Diagram



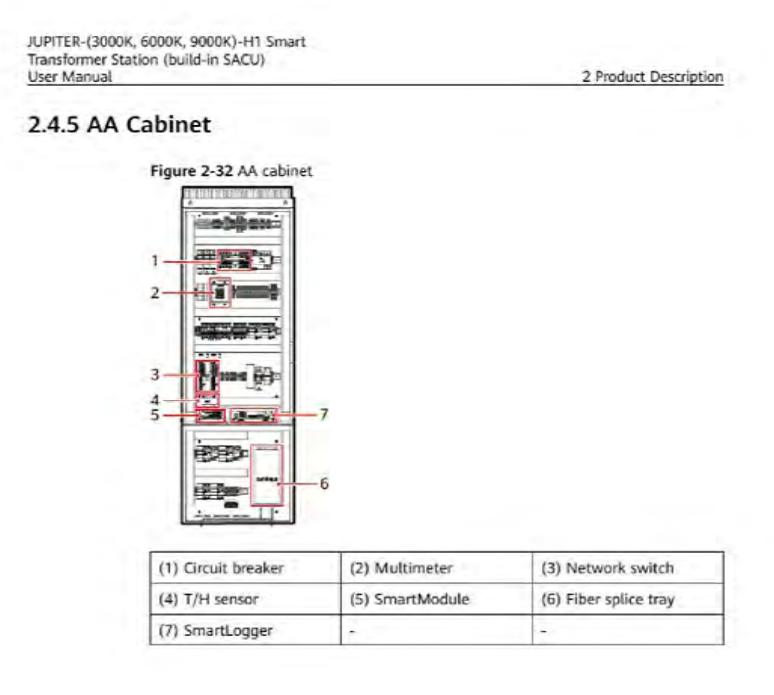
ESS & SPP MV Distpach Container



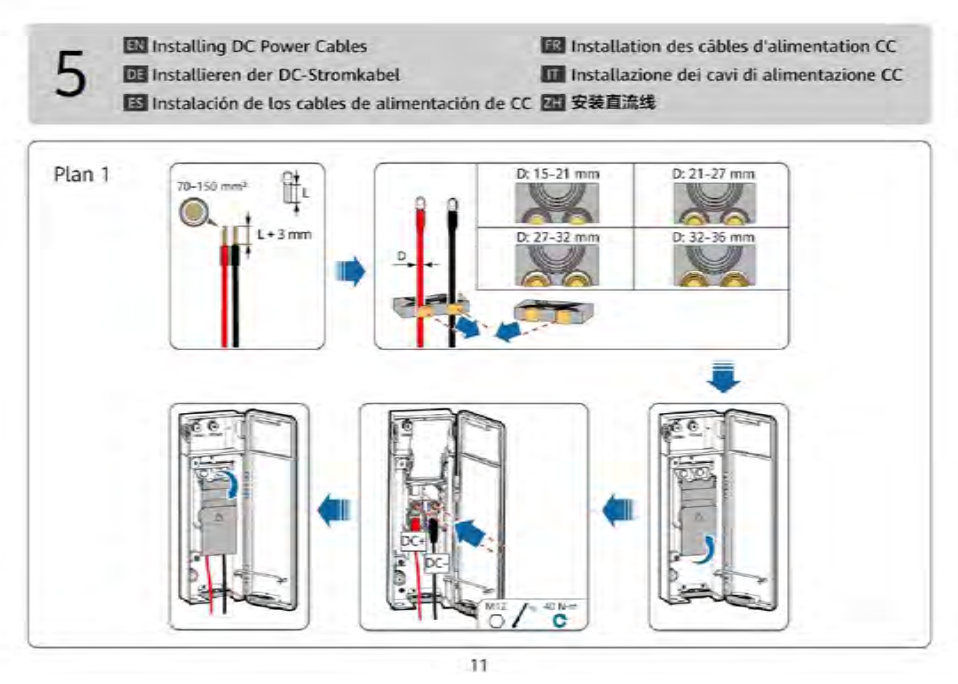
ESS Power Supply



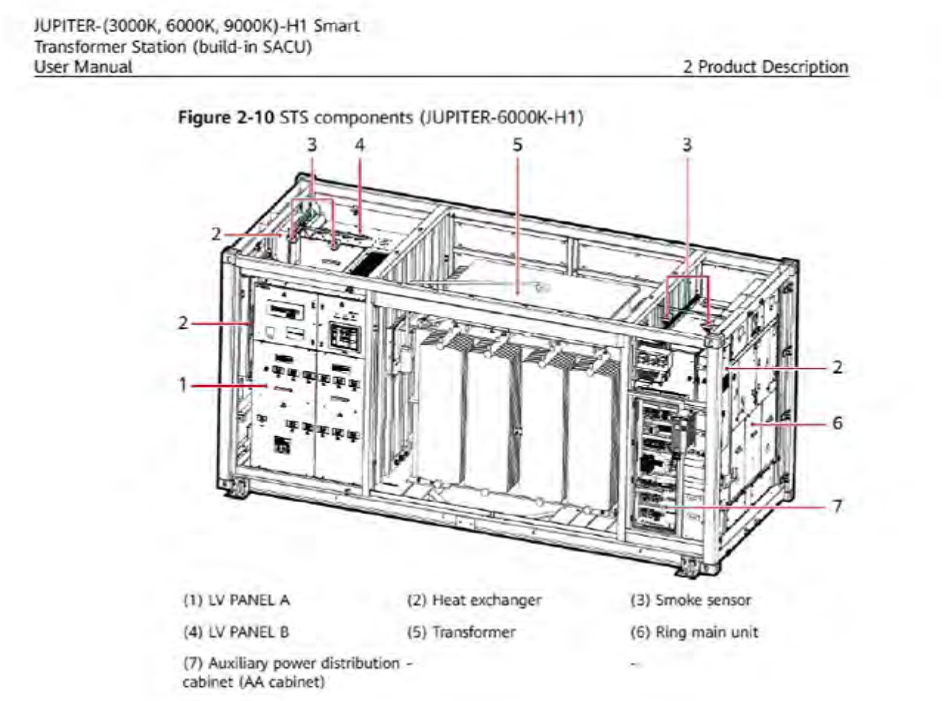
ESS DC Input



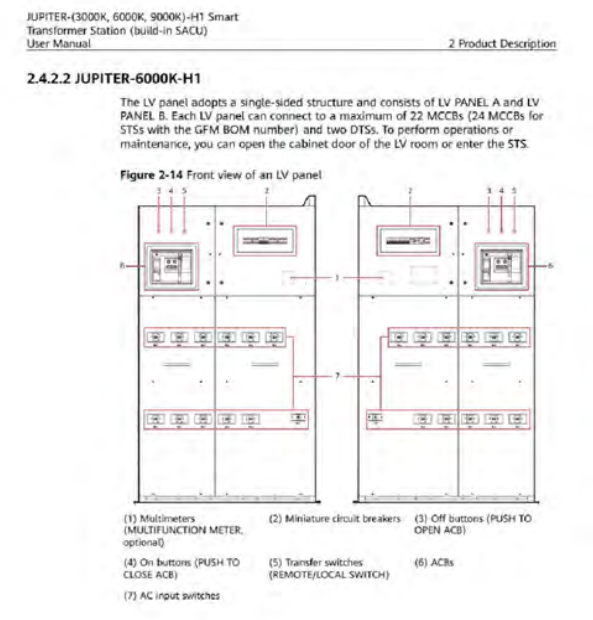
STS Power Supply



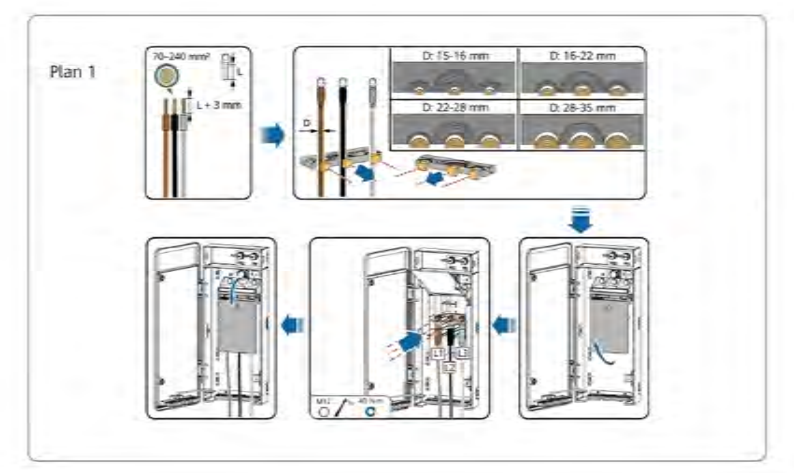
PCS Input



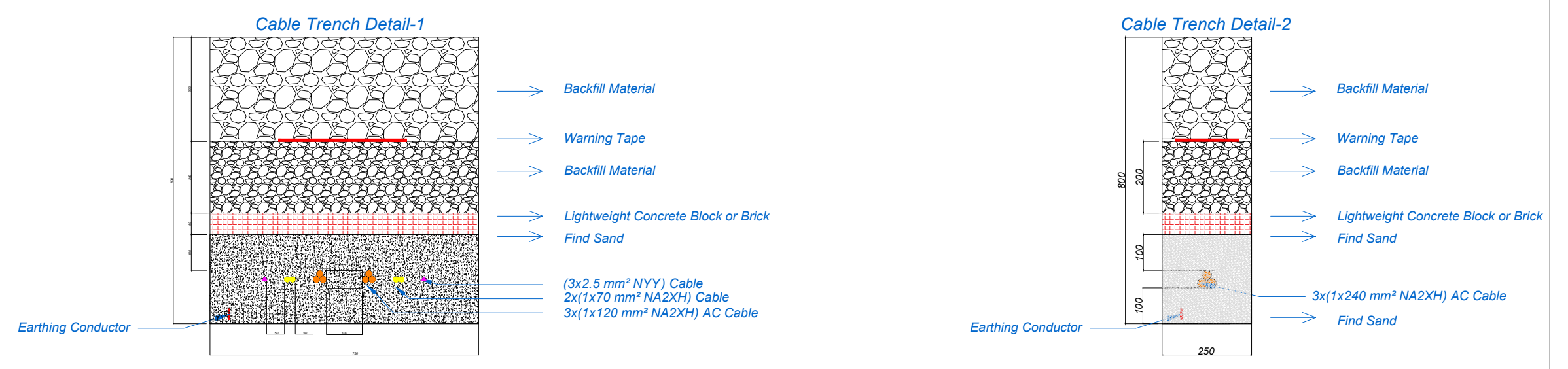
STS General Drawing



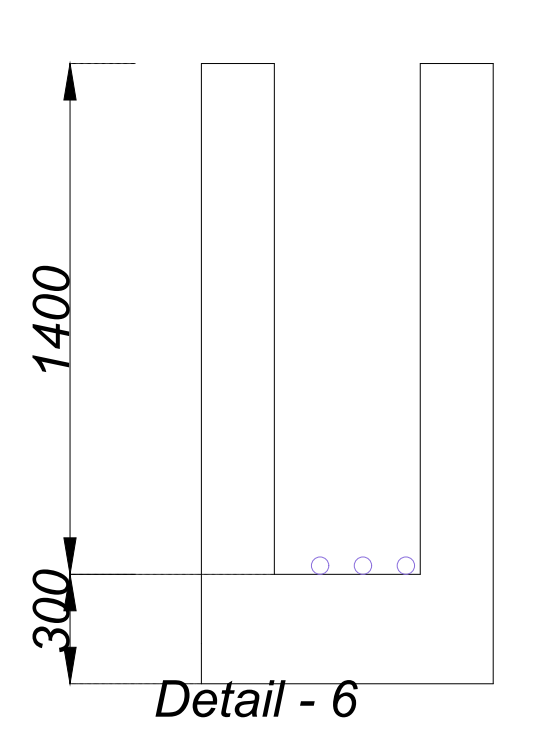
STS LV Input



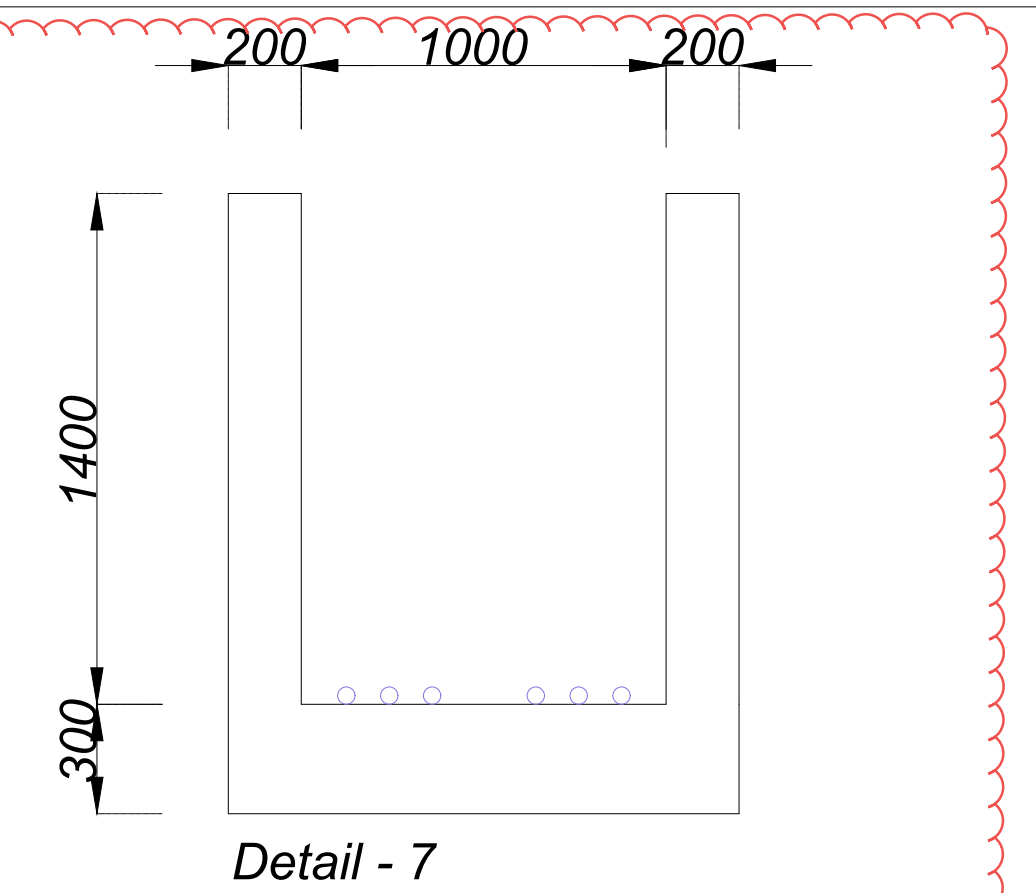
PCS LV Output


Cable Trench Detail-1
Backfill Material
Warning Tape
Backfill Material
Lightweight Concrete Block or Brick
Find Sand
(3x2.5 mm² NYY) Cable
2x(1x70 mm² NA2XH) Cable
3x(1x120 mm² NA2XH) AC Cable
Earthing Conductor
Cable Trench Detail-2
Backfill Material
Warning Tape
Backfill Material
Lightweight Concrete Block or Brick
Find Sand
3x(1x240 mm² NA2XH) AC Cable
Find Sand
Earthing Conductor
800
200
100
100
250

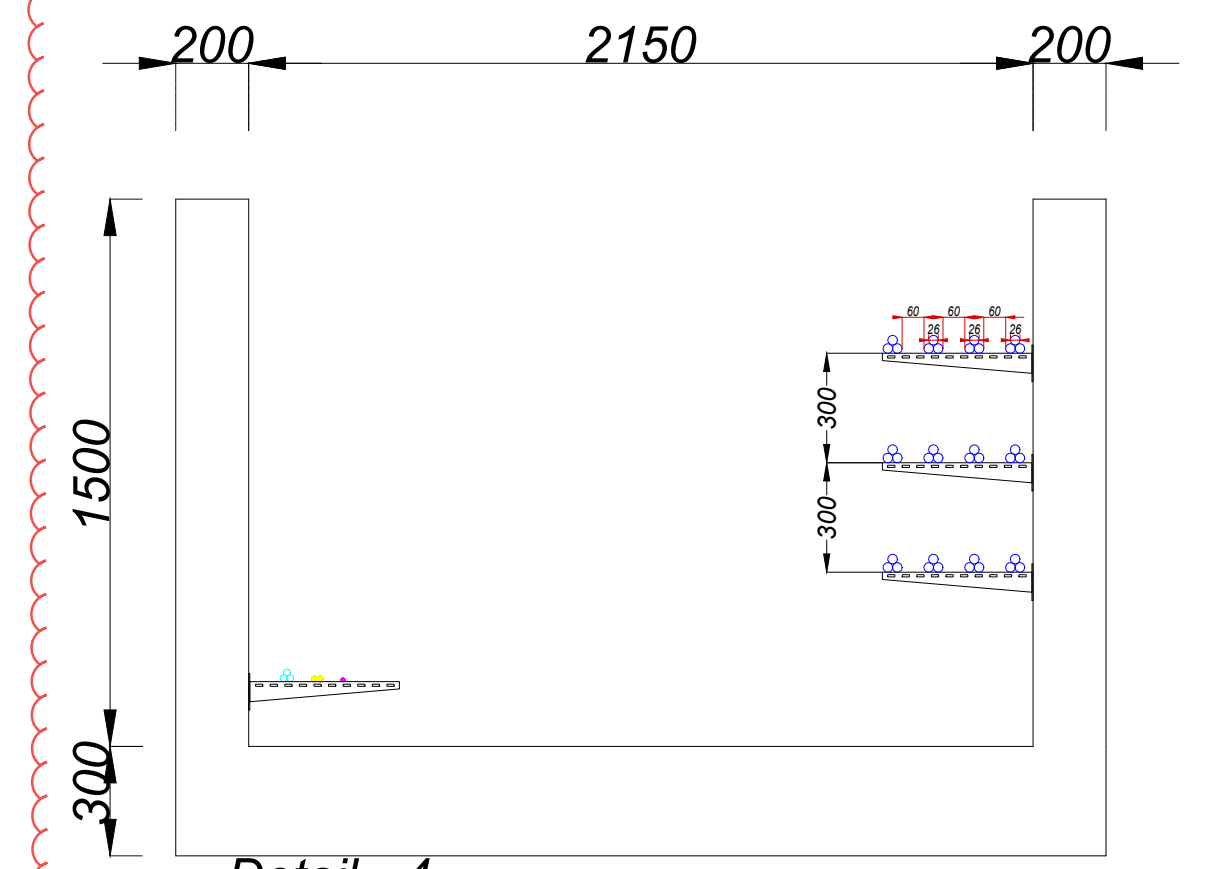
Scale: 3:1
Drawings are in mm.


200 400 200
1400
300

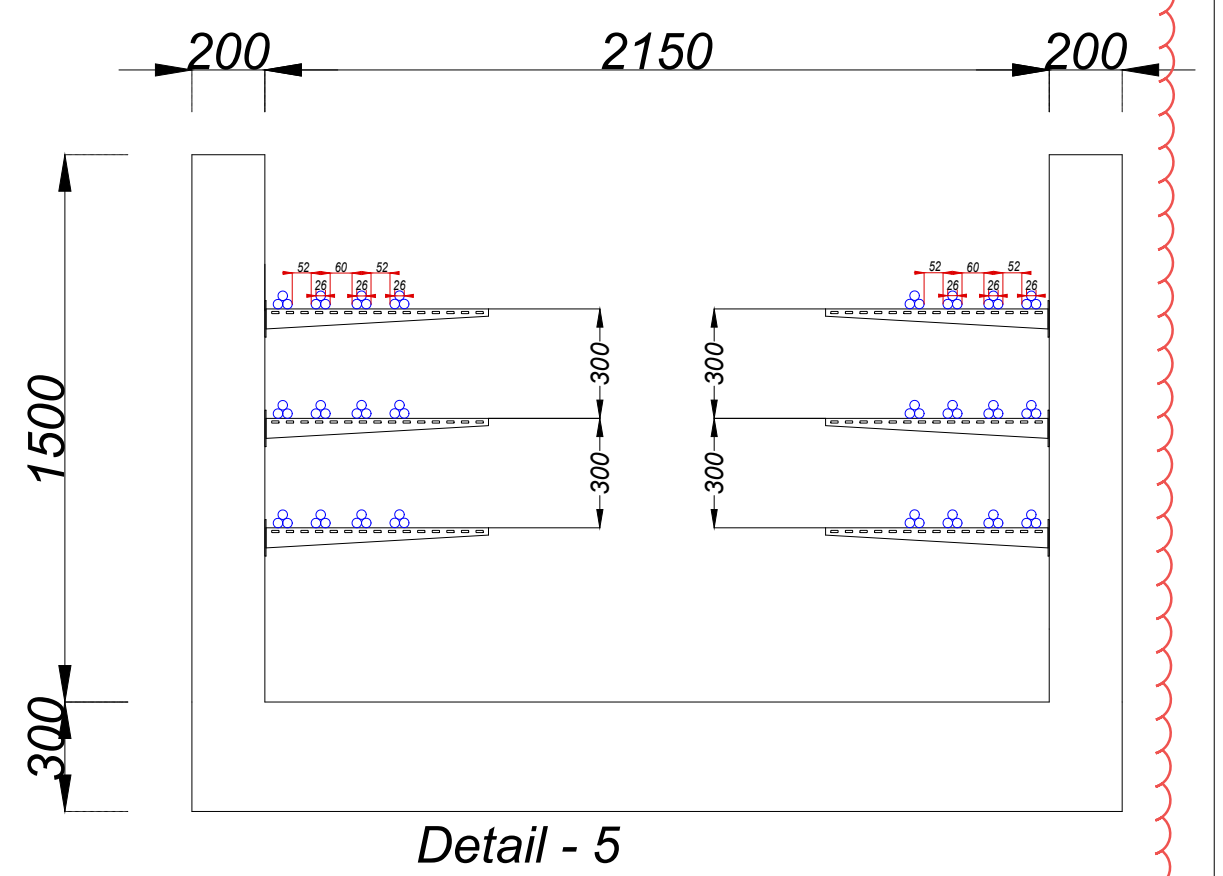
Detail - 6
MV-1 Cable Channel


200 1000 200
1400
300

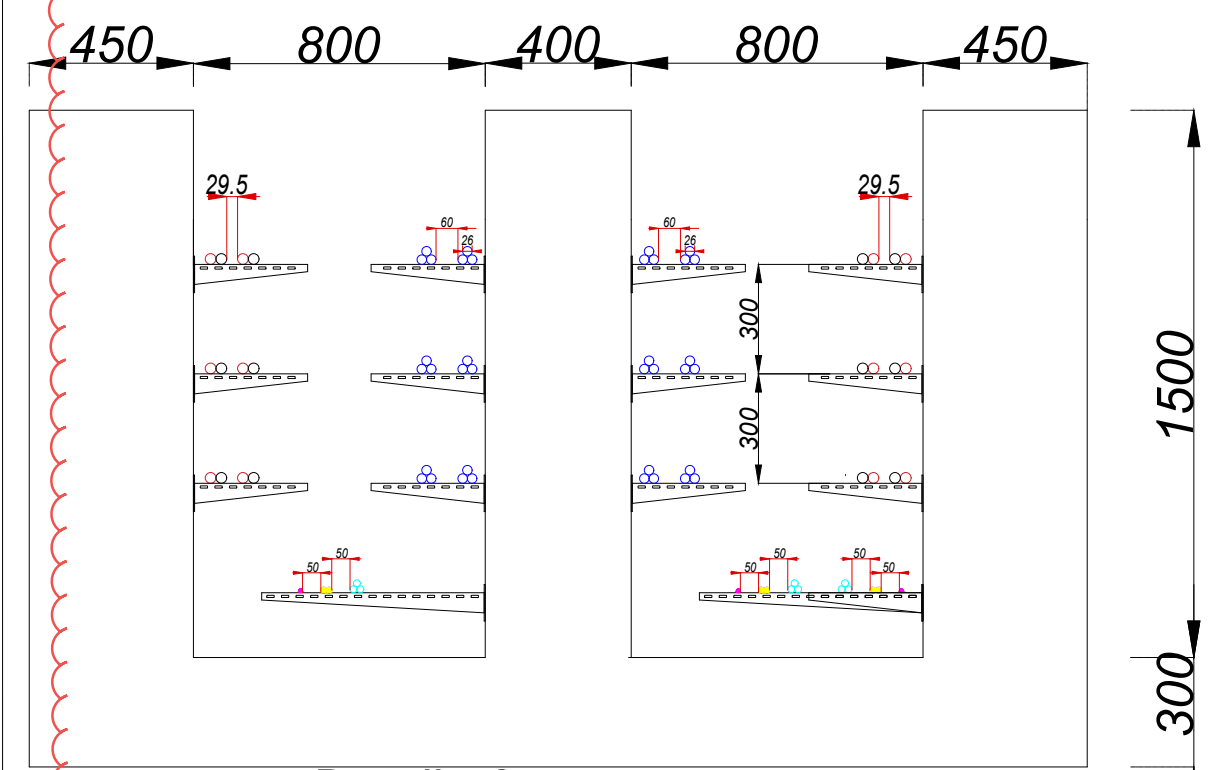
Detail - 7
MV-2 Cable Channel


200 2150 200
1500
300

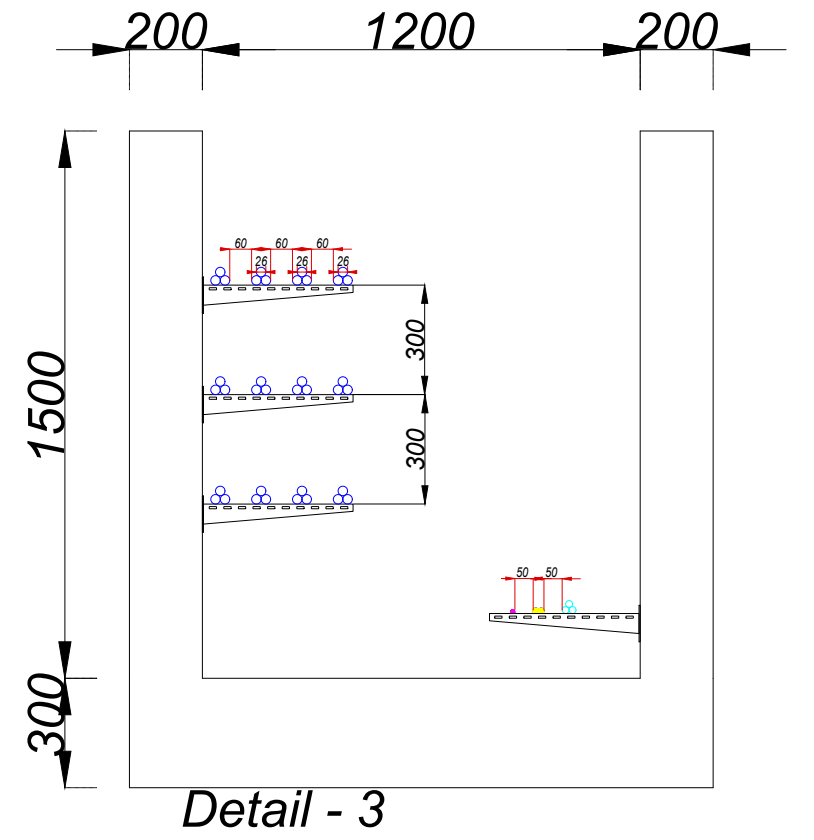
Detail - 4
LV-2 Cable Channel


200 2150 200
1500
300

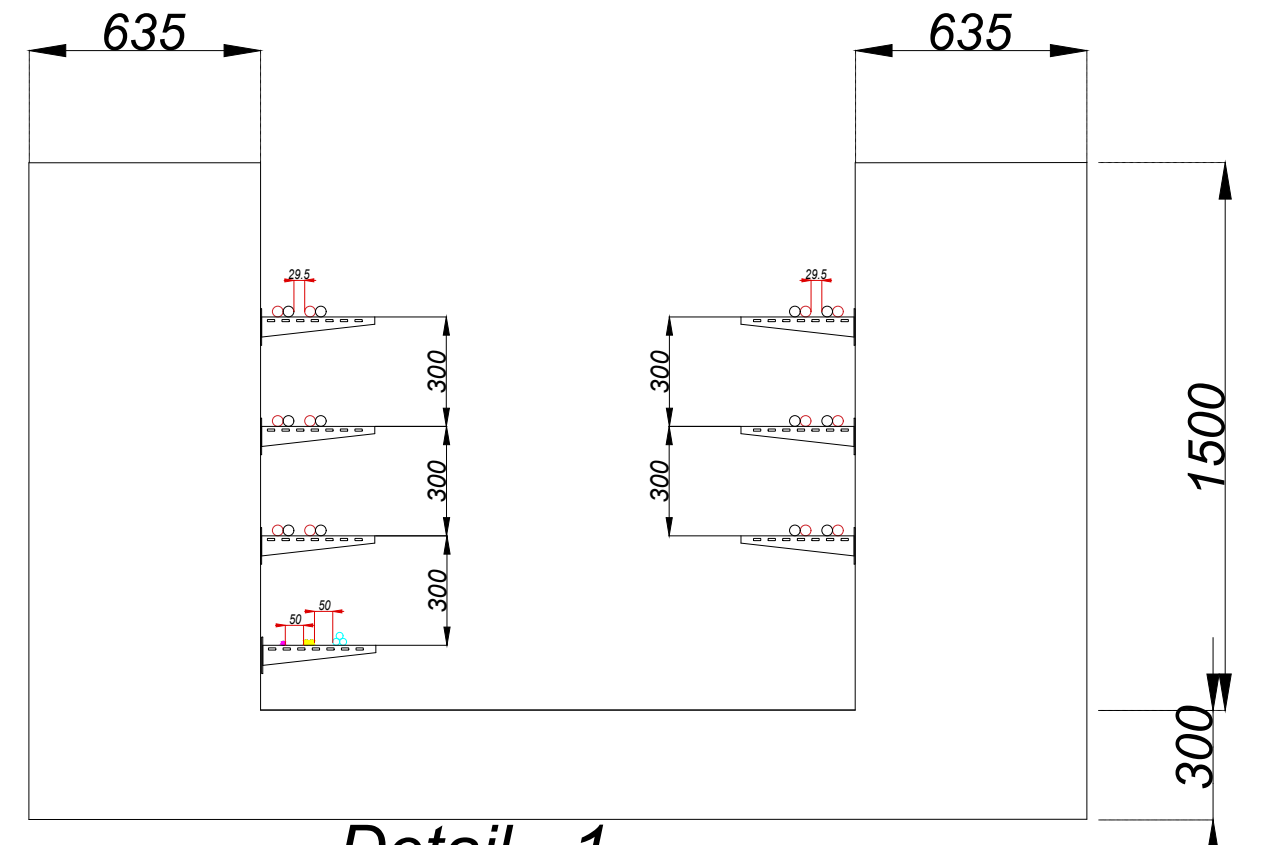
Detail - 5
LV-3 Cable Channel


450 800 400 800 450
1500
300

Detail - 2
DC-LV Cable Channel


200 1200 200
1500
300

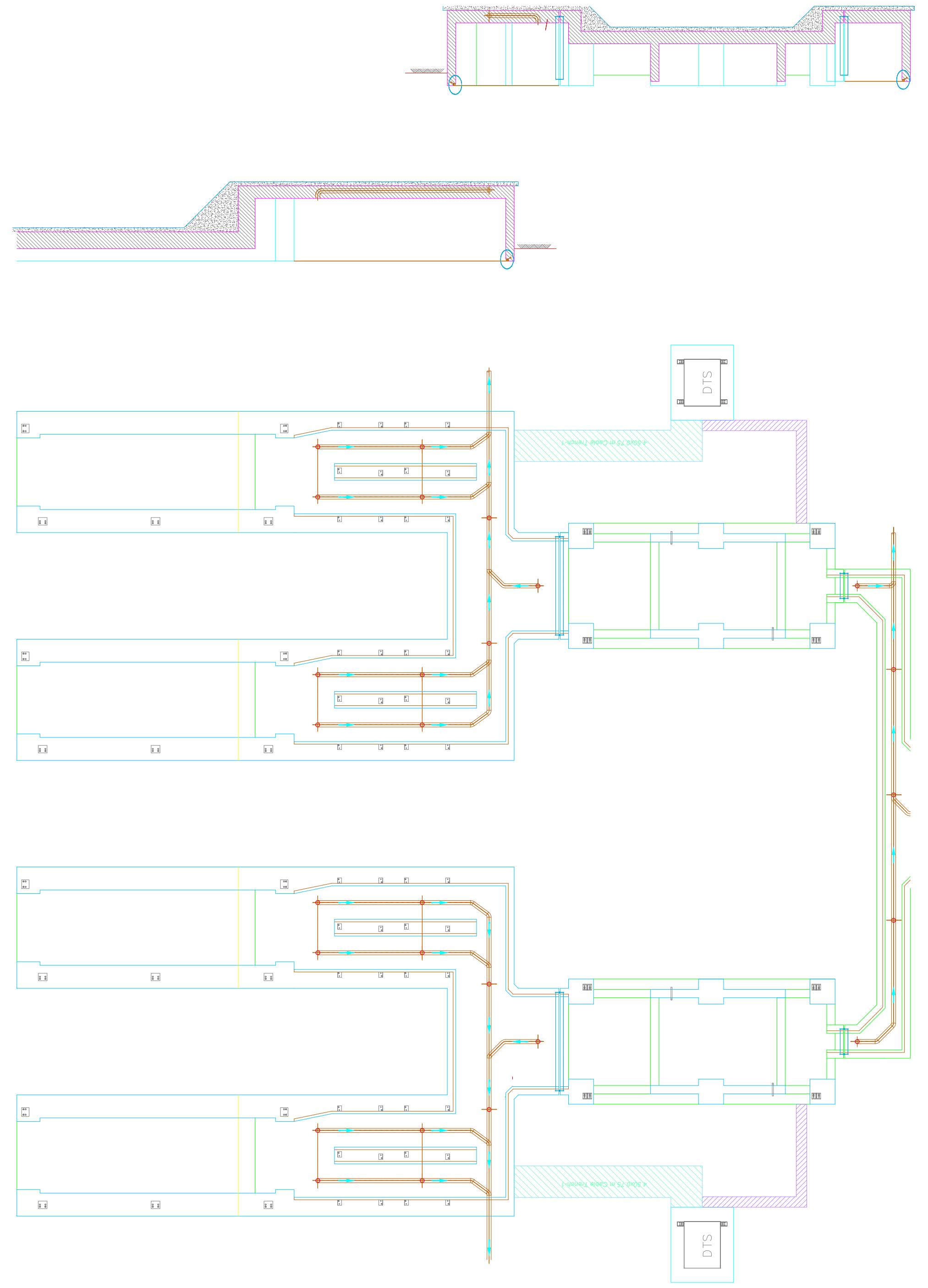
Detail - 3
LV-1 Cable Channel


635
635
1500
300

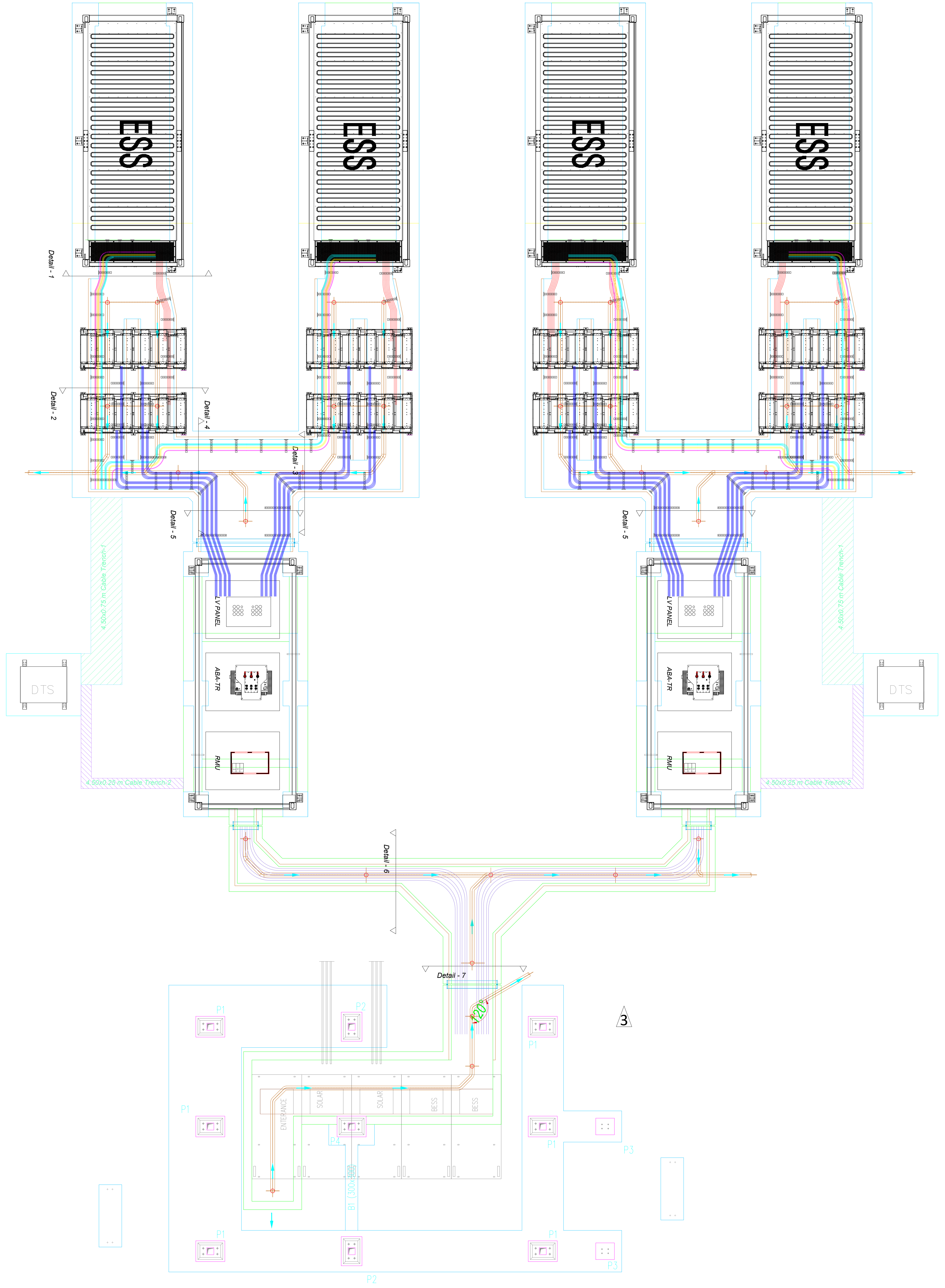
Detail - 1
DC Cable Channel

Provide cable labels

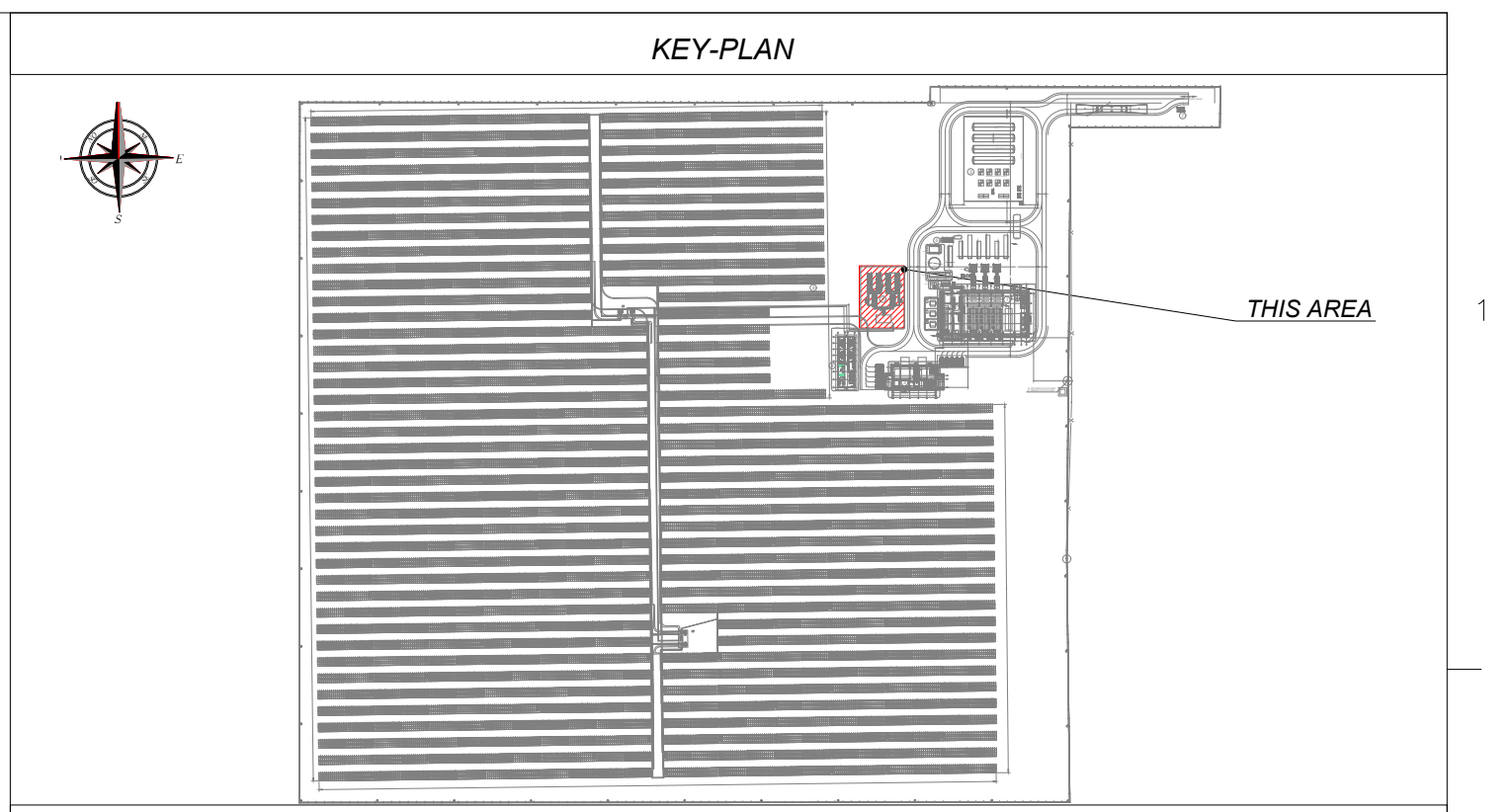
Channel Details
Scale : 2:1
Drawings are in mm.



Concrete Foundation Detail
Scale: 1:2
Drawings are in mm.


ESS
ESS
ESS
ESS
Detail - 1
Detail - 2
Detail - 3
Detail - 4
Detail - 5
Detail - 5
LV PANEL
ABA-TR
RMU
LV PANEL
ABA-TR
RMU
DTS
DTS
Detail - 6
Detail - 7
3

KEY-PLAN



REFERENCE DOCUMENTS

1. ABA-ENG-ESS-CAL-0001 - DC CABLE CALCULATION
2. ABA-ENG-ESS-CAL-0002 - LV CABLE CALCULATIONS
3. ABA-ENG-ESS-CAL-0003 - MV CABLE CALCULATIONS
4. ABA-ENG-ESS-CAL-0005 - PRIMARY EQUIPMENT SELECTION CALCULATIONS
5. ABA-ENG-ESS-CAL-0006 - FOUNDATION CALCULATION
6. ABA-ENG-ESS-CAL-0011 - GROUNDING SYSTEM CALCULATION
7. ABA-ENG-ESS-DRW-0001 - GROUNDING LAYOUT
8. ABA-ENG-ESS-DRW-0003 - SINGLE LINE DIAGRAM
9. ABA-ENG-ESS-CAL-0006 - FOUNDATION LAYOUT

LEGEND

ESS	Energy Storage System Container
	Power Conversion System (PCS)
LV PANEL ELE-TR1 RMU	Smart Transformer Station (STS)
ELE-TR1	Transformer
RMU	Ring Main Unit (RMU)
LV PANEL	Low Voltage Panel
DTS	Distribution Transformer System
	Cable Carrying Console
🟥	Direct Current Cable 2x(1x240mm2) NA2XY
🟦	Low Voltage Cable 3x(1x240mm2) NA2XH
🟪	Medium Voltage Cable 3x(1x240mm2) N2XSY
🟦	Low Voltage Cable (DTS-ESS) 3x(1x120mm2) NA2XH
🟦	Low Voltage Cable (DTS-STS) 3x(1x240mm2) NA2XH
🟨	Low Voltage Cable (DTS-ESS) 2x(1x70mm2) NA2XH
🟪	Low Voltage Cable (DTS-ESS) (3x2.5mm2) NYY

GENERAL NOTES

CLIENT

EA Energy

CONTRACTOR

iLTEKNO
ADVANCED TECHNOLOGY · POSITIVE ENERGY

DESIGNER

iLTEKNO SOLAR

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

iLTEKNO SOLAR

SIZE	SCALE
A0	1:37

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
2	4 Mar 2026	FOR APPROVAL	S.T.	A.Y.	T.S
1	19 Feb 2026	FOR APPROVAL	S.T.	A.Y.	T.S
0	01 Dec 25	FOR APPROVAL	G.G.	A.Y.	T.S

DRAWING NUMBER: ABA-ENG-ESS-DRW-0004

SHEET: 1
OF: 1

DRAWING NAME: ESS GENERAL LAYOUT

From	To	Cable length, m
Transformer TX1	TX1-INV1	111
	TX1-INV2	91
	TX1-INV3	72
	TX1-INV4	52
	TX1-INV5	33
	TX1-INV6	23
	TX1-INV7	42
	TX1-INV8	62
	TX1-INV9	81
	TX1-INV10	100
	TX1-INV11	101
	TX1-INV12	71
	TX1-INV13	42
	TX1-INV14	27
	TX1-INV15	23
	TX1-INV16	62
	TX1-INV17	91
Transformer TX2	TX2-INV1	81
	TX2-INV2	61
	TX2-INV3	42
	TX2-INV4	23
	TX2-INV5	33
	TX2-INV6	52
	TX2-INV7	72
	TX2-INV8	83
	TX2-INV9	73
	TX2-INV10	54
	TX2-INV11	44
	TX2-INV12	34
	TX2-INV13	23
	TX2-INV14	22
	TX2-INV15	42
	TX2-INV16	51
	TX2-INV17	71
Transformer TX3	TX3-INV1	43
	TX3-INV2	23
	TX3-INV3	32
	TX3-INV4	32
	TX3-INV5	27
	TX3-INV6	22
	TX3-INV7	32
	TX3-INV8	41,000

Unit: mm

1134

30

2382

2382

MODULE INFORMATION

MODULE TYPE	
Total number of modules	24.024 Adet
Dimensions(LxWxH)	2382mm x 1134mm x30mm
No. of Cells	132 (6 × 22)
Cable	2 pieces solar cable 4mm²
Connectors	Staubli MC4 EVO2

MODULE ELECTRICAL VALUES

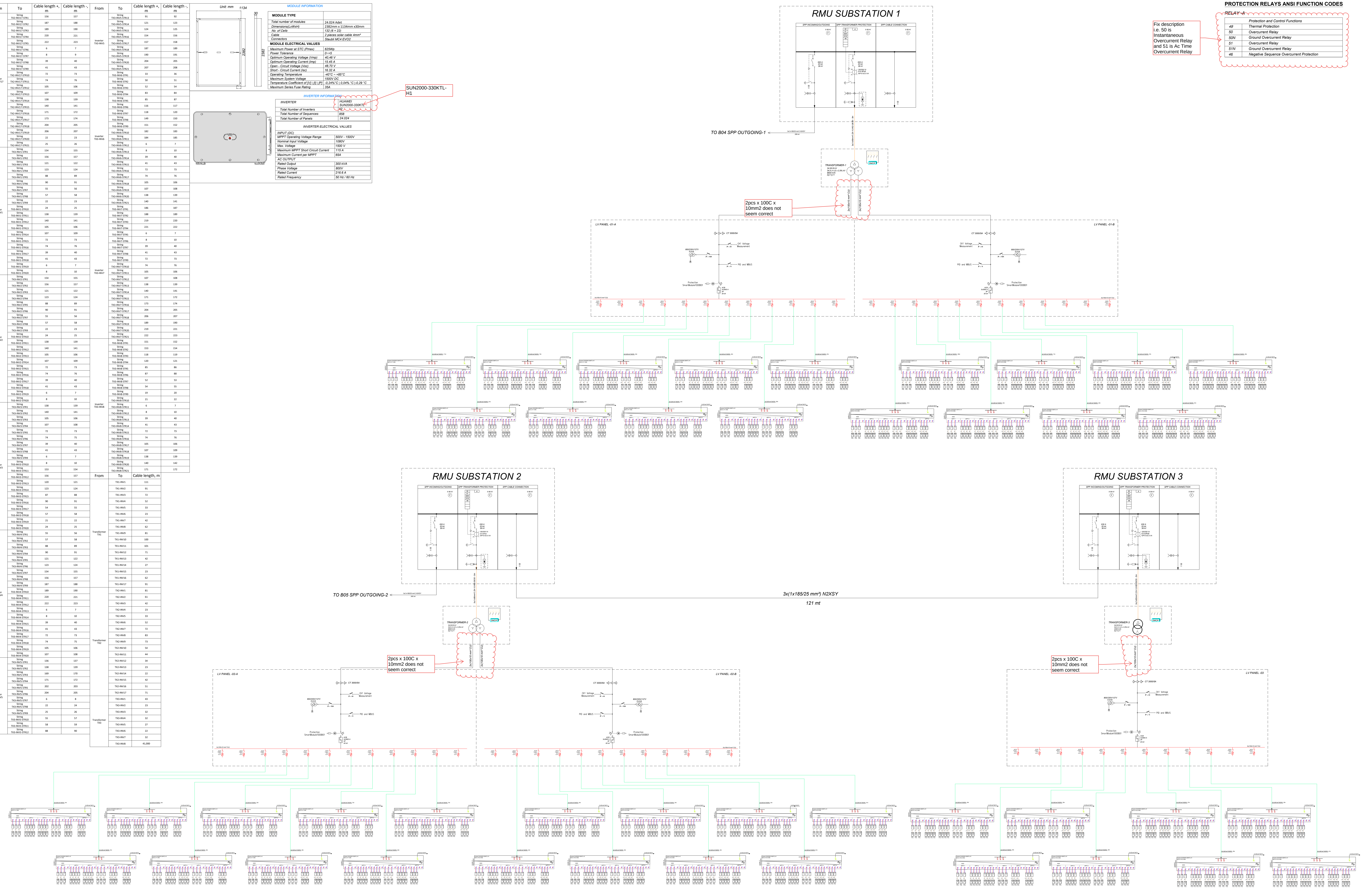
Maximum Power at STC (Pmax)	625Wp
Power Tolerance	0~+5
Optimum Operating Voltage (Vmp)	40,46 V
Optimum Operating Current (Imp)	15.45 A
Open - Circuit Voltage (Voc)	48,70 V
Short - Circuit Current (Isc)	16.32 A
Operating Temperature	-40°C ~ +85°C
Maximum System Voltage	1500V DC
Temperature Coefficient of [V] | [I] | [P]	-0,24%°C | 0,04% °C |-0,29 °C
Maximum Series Fuse Rating	35A

INVERTER INFORMATION

INVERTER	HUAWEI SUN2000-330KTL
Total Number of Inverters	42
Total Number of Sequences	858
Total Number of Panels	24.024

SUN2000-330KTL-H1

INVERTER ELECTRICAL VALUES	
INPUT (DC)	
MPPT Operating Voltage Range	500V - 1500V
Nominal Input Voltage	1080V
Max. Voltage	1500 V
Maximum MPPT Short Circuit Current	115 A
Maximum Current per MPPT	65A
AC OUTPUT	
Rated Output	300 kVA
Phase Voltage	800V
Rated Current	216.6 A
Rated Frequency	50 Hz / 60 Hz


RMU SUBSTATION 1
SPP INCOMING/OUTGOING
SPP TRANSFORMER PROTECTION
SPP CABLE CONNECTION
0-36 kV
50
51
50N
51N
46
A
630 A
20 kA
36 kV
150/200/1A
Cl:0.5Fs5
10P10 5/2.5 VA
P1
P2
K1
K2
TO B04 SPP OUTGOING-1
3x(1x185/25 mm²) N2XSY
209 mt
3x(1x95mm²) ZA-YJV62-26/35 - 5m
TRANSFORMER-1
34,5/0,8 kV
34,5 (+/-)2 x 2,5% kV
6600 kVA
Dy11y11
DMCR
2x(100x10 mm² CU)
CT 3000/5A
CK1 Voltage Measurement
3P x 6A
800/230V/127V
5 kVA
3P x 100A
PID and MBUS
3P x 1A
Protection
RMU SUBSTATION 2
TO B05 SPP OUTGOING-2
TRANSFORMER-2
LV PANEL -02-B
3x(1x185/25 mm²) N2XSY
121 mt
RMU SUBSTATION 3
TRANSFORMER-3
LV PANEL -03
MPPT-5
MPPT-6
(1x120 mm² NAYY)

2pcs x 100C x 10mm2 does not seem correct

2pcs x 100C x 10mm2 does not seem correct

2pcs x 100C x 10mm2 does not seem correct

PROTECTION RELAYS ANSI FUNCTION CODES

~~RELAY -A~~

	Protection and Control Functions
49	Thermal Protection
50	Overcurrent Relay
50N	Ground Overcurrent Relay
51	Overcurrent Relay
51N	Ground Overcurrent Relay
46	Negative Sequence Overcurrent Protection

Fix description i.e. 50 is Instantaneous Overcurrent Relay and 51 is Ac Time Overcurrent Relay

REFERENCE CALCULATIONS AND DRAWINGS

ABA-ENG-SLR-CAL-0002-LV CABLE CALCULATIONS
ABA-ENG-SLR-CAL-0003 DC CABLE CALCULATION
ABA-ENG-SLR-CAL-0004 MV CABLE CALCULATION
ABA-ENG-SLR-CAL-0006 PRIMARY EQUIPMENT SELECTION CALCULATIONS
ABA-ENG-SLR-CAL-0012 PANEL-INVERTER COMPATIBILITY CALCULATIONS
ABA-ENG-ELC-SLD-0001_3 PLANT SINGLE LINE DRAWING
ABA-ENG-SLR-LYT-0003- SOLAR POWER PLANT GENERAL LAYOUT
ABA-ENG-ELC-DRW-3000 CONTROL SYSTEM TOPOLOGY

LEGEND

	Transformer		LV Busbar
	Pv Module		DC Cable
	MV Circuit Breaker		Surge Protective Device (SPD)
	MV Current Transformer (MV CT)		MV Cable
	MV Voltage Transformer (MV VT / MV PT)	Ⓥ	Voltage Measurement (Voltmeter)
	MV Auxiliary Transformer		Voltage Indicator
	LV Main MCCB (Main Circuit Breaker)		
	LV Current Transformer (LV CT)		
	Grounding		
	Inverter		
	Inverter AC MCCB		
	LV Power Cable (NA2XH)		
	Fuse		

GENERAL NOTES

Inverter Grid Protection Functions:
OV, UV, OF, UF, ROCOF, Anti-islanding
(Reference: Huawei SUN2000-330KTL User Manual – Grid Fault & Protection Alarms)

SPD Usage and Classification:
- DC-side SPD: Type II (integrated in Huawei SUN2000 inverter)
- AC-side SPD: Type II (integrated in Huawei SUN2000 inverter)
- SPP MDP SPD: Type II (panel-level surge protection)

(The configuration complies with IEC 61643-32 SPD selection and coordination principles.)

CLIENT

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CONTRACTOR

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DESIGNER

iLTEKNO SOLAR

SITE / PROJECT

BAHAMAS / ABACO HYBRID POWER PLANT PROJECT

ISSUE OWNER

iLTEKNO SOLAR

SIZE	SCALE
A0	-

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
1	29 Dec 25	FOR INFORMATION	O.S	A.Y	T.S
0	13 Oct 25	FOR INFORMATION	O.S	A.Y	T.S

DRAWING NUMBER:
ABA-ENG-SLR-DRW-0004

SHEET: 1
OF: 1

DRAWING NAME:
SINGLE LINE DIAGRAM

iLTEKNO

BILL of MATERIAL Solar & BESS System

No	Equipment Name	Manufacturer/Supplier	PO status	Quantity (ea)	Datasheet
1	ESS	Huawei	Done	4 each / 5015kWh	ESS\Luna2000.pdf
2	PCS	Huawei / LUNA2000-213KTL-H0	Done	48 each	BESS PCS\Luna2000-213KTL.pdf
3	STS for BESS System	Huawei / 6000KTL	Done	2 each / 6600kVA	STS for BESS\Jupiter-9000K6000K3000K.pdf
4	Solar & BESS microgrid controller	Huawei / MGCC-A02	Done	1 each	Solar & BESS microgrid controller\Smart_Microgrid.pdf
5	Solar Plant STS	Huawei / 6000KTL & 3000 KTL	Done	3 each (2 each 6600kVA + 1 each 3300kVA)	STS for Solar\Jupiter-9000K6000K3000K.pdf
6	Solar Inverters	Huawei / SUN2000-330KTL-H1	Done	42 each	Solar Inverters\Inverter 330KTL.pdf
7	Solar Panels	Trina	Ongoing	24.084 each / 625W	Solar Panel\DT-M-0117-G_Datasheet_210R_NED19RC.20_EN_2025PA4_web_20250425.pdf

DO NOT AGREE WITH THE ONE LINE DIAGRAM DRAWING
ABA-ENG-SLD-0004-SINGLE LINE DIAGRAM